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Alaska Department of Fish and Game
Division of Commercial Fisheries
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Compilation of Catch, Escapement, Age, Sex, and Size

Data for Salmon Returns to the Yakutat Area in 1988

by

Melinda L. Rowse

State of Alaska

Steve Cowper, Governor

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COMPILATION OF CATCH, ESCAPEMENT, AGE, SEX, AND SIZE DATA
FOR SALMON RETURNS TO THE YAKUTAT AREA IN 1988

Melinda L. Rowse

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ABSTRACT

Abundance, age, sex, and size data were gathered for the adult salmon returns to the Yakutat area in 1988 as part of a continuing program to monitor the population parameters used in management of area fisheries. Set gill net fishermen harvested 518,378 salmon, 39% above the 1978 to 1987 average. Most streams, with the exception of the Alsek River, had average or above average sockeye salmon (*Oncorhynchus nerka* Walbaum) returns. Pink salmon (*O. gorbuscha* Walbaum) returns and harvests were very strong, although sockeye salmon and coho salmon (*O. kisutch* Walbaum) comprised 71% of the total salmon harvest. Chum salmon (*O. keta* Walbaum) returns were very strong in the East Alsek River and average in other systems. The incidental chinook salmon (*O. tshawytscha* Walbaum) harvest of 893 fish was 44% below the 1978 to 1987 average.

The Situk River sockeye salmon catch of 52,108 was the second highest harvest since 1977. Sockeye salmon returns to the Alsek River were poor with a catch of only 6,286, and a Klukshu weir escapement of only 9,337 fish. The East Alsek River sockeye salmon set net harvest of 61,483 accounted for 38% of the total 1988 sockeye harvest. Yakutat area coho salmon catches were well above average, and the total set net catch of 205,866 fish was 57% above the 1978 to 1987 average of 131,371 fish. The chum salmon harvest of 29,247 fish was 112% above the 1978 to 1987 average of 13,804; the East Alsek River catch of 24,453 chum salmon accounted for 84% of the total. Pink salmon returns were very strong with a harvest of 120,204 fish that was 118% above the 1978 to 1987 average of 55,013 fish. Alaskan subsistence fishermen reported catches of 196 chinook salmon, 2,119 sockeye salmon, and 176 coho salmon. Canadian subsistence catches totaled 43 chinook and 1,604 sockeye salmon from Alsek River tributaries. Sport fishermen in Alaska caught an estimated 185 chinook, 1,182 sockeye, 6,115 coho, and 1,265 pink salmon; Canadian sport fishermen caught 275 chinook, 322 sockeye, and 192 coho salmon in the Alsek River drainage.

Chinook salmon catches and escapements in the Alsek and Situk Rivers were dominated by age-1.2, -1.3, and -1.4 fish. Yakutat Bay chinook salmon harvests were dominated by age-0. fish, indicating presence of non-Alaskan stocks. Age-1.3 fish dominated sockeye salmon catches in the Situk, Lost, Alsek, and Dangerous Rivers, and in the Yakutat Bay and Manby Shore fisheries. Age-0.3 fish dominated Akwe and East Alsek River fisheries. Coho salmon harvests consisted predominantly of age-1.1 and -2.1 fish, and chum salmon were predominantly age-0.3.

KEY WORDS: Salmon, Yakutat, set gill net, sport, subsistence catches, escapement, age, sex, size, weirs

INTRODUCTION

Commercial fishing in the Yakutat area began in 1902 and was virtually unregulated until 1927. The fisheries were managed by the federal government until statehood when the Alaska Department of Fish and Game (ADF&G) assumed management responsibility. All five North American salmon species are taken in the Yakutat area (Figures 1, 2) salmon fisheries, sockeye salmon (*Oncorhynchus nerka*) being the most intensively harvested. Coho salmon (*O. kisutch*) provide harvests secondarily in the later part of the season, while chum (*O. keta*) and pink (*O. gorbuscha*) salmon are harvested in smaller numbers. No directed commercial set gill net fishery on chinook salmon (*O. tshawytscha*) has occurred in the Yakutat area since 1963. All chinook salmon harvested by set gill nets are taken incidentally during the early sockeye fisheries, primarily in the Situk and Alsek Rivers.

Sockeye salmon abundance in the Yakutat area have been highly variable between years and stocks, presenting a variety of fishery management problems. Sockeye salmon catches in the Situk River peaked in the early 1900's and then steadily declined to a low of 7,394 fish in 1984. However, unexpected catches of 63,399 fish were observed in 1987 and 52,108 fish in 1988. Sockeye salmon returns to the East Alsek River have dramatically increased in recent years and currently support the largest sockeye salmon fishery in the Yakutat area. These changes in abundance have contributed to large shifts in fishing effort and alterations in fishing schedules.

Yakutat area coho salmon runs, although variable, have generally been healthy. Management of the coho salmon resource has been hampered by the lack of (1) precise spawning stock evaluation techniques, (2) preseason forecasts of abundance to address wide fluctuations in returns, and (3) assessment of the effects of coastal and offshore troll fisheries on individual stocks.

Chinook salmon runs have generally been depressed since the 1940's. Regulatory measures to minimize their commercial exploitation in the inshore commercial fisheries were initiated in 1963. Management of both the sockeye and chinook salmon returns to the Alsek River, a transboundary river for which proprietorship is shared between Alaska and Canada under the U.S./Canada Pacific Salmon Treaty, has been complicated by allocation controversies between the lower river Alaskan commercial fishery and the upriver Canadian sport and subsistence fisheries (McBride 1986).

The Yakutat Management Area consists of the inshore waters between Cape Fairweather and Cape Suckling. Inshore fishing districts (182, 183, 185, 186, and 192) are broken into subdistricts primarily by river system. The subdistricts include these rivers: Doame (182-10), East Alsek (182-20), Alsek (182-30), Akwe (182-40), Italio (182-50), Dangerous (182-60), Situk (182-70), Lost (182-80), Yahtse (185-10), Yakataga (192-30), Kaliakh (192-41), and Tsiu (192-42) (ADF&G 1987; Figures 1, 2). Several mixed stock fishery areas also occur in the Yakutat area, including: Yakutat Bay (183-10) and Manby Shore (183-20). ADF&G manages all of these fisheries, while the Canada Department of Fisheries and Oceans (CDFO) manages subsistence and sport fisheries in the upper Alsek River drainage (Figure 3).

Set gill net gear is the only net gear permitted in the Yakutat area; approximately 140 to 160 set gill net entry permits have been renewed annually since 1974. These permit holders do not have registered sites and may fish anywhere within an open fishing area. They may also move between fisheries in the area during the season. The Yakutat coastal waters also support mixed stock troll fisheries targeting on coho salmon. The troll fishery is not addressed in this report. The magnitude and age, sex, and size composition of the troll fisheries have been reported by Mesiar (1984), Van Alen and Wood (1986, 1987), and Wood and Van Alen (1987).

No formal forecasts are made by ADF&G for the Yakutat area salmon stocks. Seasonal expectations are derived from parent year catch, escapement, and age structure information. In-season management of each river fishery is based on catch per unit effort analysis of the commercial catch and salmon escapement rates.

Addressing these and other concerns involving management of the Yakutat salmon resource requires knowledge of brood stock requirements needed to maintain the population at a level capable of producing optimal yield. To determine optimum yield, data on the abundance, distribution, age, sex, size, and species composition of harvests and escapements must be compiled and assessed. Age composition provides basic data for stock contribution estimates, brood year returns, and exploitation rates. Size data are used to monitor growth parameters, environmental variability, and gear selectivity. Age and size data can be combined to aid in forecasting future returns. Migratory timing data can be used to identify interannual shifts in run timing.

This report presents base line population statistics on numbers, age, sex, and size compositions for the 1988 inshore return of salmon to the Yakutat area. It builds upon the data base established for the salmon runs to the Yakutat area in 1982 (McBride and Brogle 1983), 1983 (McBride 1984), 1984 (McBride 1986), 1985 (Riffe et al. 1987), 1986 (Pahlke and Riffe 1988), and 1987 (Pahlke 1989).

METHODS

Abundance Data

Alaskan commercial catch data presented in this report were compiled by the Division of Commercial Fisheries, ADF&G, and originated from individual sales slips (fish tickets) tabulated as of November 16, 1989. Catch data were edited for data entry and recording errors. Because embedded errors or additions are sometimes found at a later date, data file listings in the future may show minor differences from those given in this report. Catches were assigned to a statistical week, which begins at 00:01 AM each Sunday and ends the following Saturday at midnight. Statistical weeks are numbered sequentially beginning with the week encompassing the first Sunday in January. Inclusive dates for 1988 are shown in Appendix A.1.

Commercial set net fishing was permitted only during specified weekly fishing periods and in select areas. The fishing time and number of boats that fished each week in each set net fishery was reported by Thomason and Woods (1988). Sport catch data were available for the Situk and Lost Rivers and Ankau Lagoon (Suchanek and Bingham 1989). Subsistence catches in Alaska were estimated from permits voluntarily returned by fishermen. Return rates for these permits in 1988 were 92% for coho salmon and 90% for sockeye and chinook salmon. CDFO compiled sport and Indian food fishery (subsistence) catches and escapement counts from the upper Alsek River system (Pete Etherton, CDFO, Whitehorse, personal communication).

Most of the escapement enumeration data presented in this report were obtained from aerial surveys (Thomason and Woods 1988). These data are considered indices of relative abundance and do not represent a complete enumeration of season escapement. However, aerial survey data for some river systems and species were extensive enough to estimate the total spawning escapement. The precision of these estimates is not known, and the interannual variability is probably large. Aerial survey data for sockeye salmon escapements in the East Alsek and Italio River systems, and coho salmon escapements to the Lost and Tsiu Rivers, are presented as rough estimates of the total spawning escapement. In 1988 boat and foot surveys were conducted to provide additional escapement information in the Situk and Lost Rivers. Accurate aerial escapement surveys for coho salmon were prevented by flood conditions in September in Yakutat Bay, Manby Stream, and the Kaliakh River. Salmon escapements to the Situk River and to the Klukshu River (Alsek River system) were counted through weirs.

Age, Sex, and Length Data

Fish were sampled for age, sex, and length. Scales for age analysis were collected from the 'preferred area' on the left side of the fish approximately two rows above the lateral line along a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin (INPFC 1963). Scales were mounted on gummed cards to allow impressions to be made in cellulose acetate (Clutter and Whitesel 1956). Age was determined by visual examination of scale impressions magnified approximately 70x on a microfiche reader. Ages were reported in European notation. The first numeral refers to the number of years of freshwater residence after emergence, the second number refers to the number of years of marine residence, and total age is the summation of these two numbers plus one. Sex determination was based on examination of either gonads or external morphometric characteristics such as kipe development, belly shape, trunk depth, and jaw shape. Accuracy of sex determination was evaluated in 1987 by examining 4,923 sockeye and 570 chum salmon from commercial catches throughout the Southeast Alaska region (K. Pahlke, ADF&G, Commercial Fisheries Division, Douglas, personal communication). Fish were first sexed by examining external morphological characteristics, then sex was verified by examination of the gonads. Accuracy was 94% overall for sockeye salmon, and 91% overall for chum salmon. It is believed that the accuracy of sex determinations in escapement samples is higher because of further development of secondary maturation characteristics in fish sampled on or near the spawning grounds as compared with fish sampled from commercial catches. Fish length was measured from mid-eye to

fork-of-tail and was recorded to the nearest 5 mm on all fish except those sampled by CDFO staff in the Alsek River system. These were measured from snout to fork-of-tail. All lengths were recorded in millimeters.

Samples of the catch were collected from most sockeye, chinook, and coho salmon commercial fisheries. Chum salmon commercial catches from the East Alsek River were also sampled.

Samples of the escapements were collected by ADF&G personnel from live sockeye salmon spawning populations that passed through the Situk and Mountain Lake weirs, and CDFO personnel sampled sockeye salmon escapements at the Klukshu River weir.

Age compositions were computed for each sampled fishery. Sampling goals were to collect enough samples to estimate the proportion of each age and the average length by age, in an infinite population to within ± 5 percentage points 90% of the time in each stratum based on the multinomial formulas presented by Thompson (1987); finite population sizes were adjusted with a standard binomial formula from Cochran (1977) (Appendix A.2). In order to examine the data for temporal trends, the major sockeye salmon fisheries (East Alsek, Alsek, Situk, and Yakutat Bay) were each sampled with weekly goals (300 scales per week), while all other fisheries were sampled with single time strata. Weekly strata with small sample sizes were pooled.

Age, sex, and length compositions were also computed for each sampled escapement. Sockeye salmon samples collected from the Situk River and Mountain Lake escapement weirs were stratified over time.

Totals from each sample period were summed to represent the age and sex composition over the entire season for each fishery and each escapement having accurate abundance data. Standard errors of the age class proportions were calculated by standard binomial formulae and standard errors for estimates expanded to abundance data were calculated to reflect finite population size (Cochran 1977) as follows:

$$SE_{ij} = \sqrt{\left[\frac{\hat{P}_{ij} (1 - \hat{P}_{ij})}{\hat{n}_j - 1} \right] \left[1 - \frac{n_j}{C_j} \right]} \quad (1)$$

where: i = age class,

j = stratum,

P_{ij} = proportion of fish of age i in stratum j , and

n_j = sample size for stratum j .

The standard errors for the total season commercial catch or escapement were estimated by weighting the standard error for each sampling period by the total commercial catch (or escapement) during the same sample period as follows:

$$SE_i = \sqrt{\frac{\sum_{j=1}^j (SE_{ij})^2 C_j^2}{C^2}} \quad (2)$$

where: C_j = catch or escapement in stratum j , and
 C = total season catch or escapement.

Changes in age composition among strata were tested for significance using a Z-test to compare two proportions (Zar 1984).

Length data were also collected from all sampled fisheries and escapements, and mean lengths and their standard errors were calculated for each sex and age class within individual sampling periods. Sampling goals from the catch were to collect sufficient numbers from each stratum to estimate the average length of each major age class (i.e., those comprising more than 10% of the catch) to within ± 5 percentage points 90% of the time. A general length sub-sampling goal of 20% of the number of fish sampled for scales was established to meet this statistical level. Weighted mean lengths and standard errors for the entire season were calculated for each age class. A Z-test was used to identify significant changes in average length among strata (Zar 1984). All escapement samples included length measurements.

Average weight data obtained from the ADF&G fish ticket reporting system were calculated by dividing the total pounds reported by the total number of fish reported.

Migratory Timing

Migratory timing statistics for the major sockeye salmon set gill net fisheries and for wired escapements were calculated to provide an index of relative timing.

The means and standard deviations of migratory timing, and associated migratory time density functions of sockeye salmon were derived using methodology described by Mundy (1979, 1982). The empirical migratory time density is defined as the time series of daily or weekly proportions, P_t such that:

$$P_t = n_t / N \quad (3)$$

where:

n_t = abundance during time interval t , and

N = total annual abundance.

For a migration over a space of m days, the mean of t is estimated by:

$$\bar{t} = \sum_{t=1}^m t \times P_t \quad (4)$$

and its variance is estimated by:

$$\hat{S}_t^2 = \sum_{t=1}^m (\bar{t} - t)^2 P_t \quad (5)$$

The mean time of arrival (\bar{t}) for weired escapements is expressed in days (central day), while for catches it is expressed in weeks (central week, based on statistical weeks).

Historical Catches and Age Compositions

Total Yakutat area annual salmon harvests from 1960 through 1988, by species are presented in Table 1. Historical harvests by species and subdistricts are presented in Appendices B.1 to B.13. Historical age compositions (1982 through 1988) are presented in Appendices C.1 to C.4.

RESULTS AND DISCUSSION

Sockeye and coho salmon accounted for most of the commercial, sport, and subsistence harvest of salmon in Yakutat area fisheries (Tables 2, 3). Commercial harvest of all salmon species is presented by fishery for 1988 in Table 4. Escapement estimates by species and river system are presented in Table 5. Summaries of commercial catches, escapements, and age and length compositions by species are presented in Tables 6-20. Unsummarized details of the catch, effort, age, sex, and length data are presented by fishery and species in the companion volume to this report (Rowse 1990).

Chinook Salmon

Yakutat area chinook salmon runs were well below average in all rivers in 1988. The Alsek River escapement of 2,030 fish past the Klukshu River weir was approximately 400 fish below average for the years the weir has been in operation. The Alsek River catch of 223 chinook salmon was 75% below the 1978 to 1987 average catch of 885, but was nearer the average of 346 fish from 1985

through 1987 (Appendix B.2). During the period 1985 through 1987 efforts were made to reduce chinook catches in the commercial fishery. Gill net mesh size was again restricted this year to 6 in (15 cm) or less on the Alsek River to reduce the incidental catch of chinook salmon. Alsek River chinook salmon strayed into the lower East Alsek River in late May and early June in numbers large enough to cause managers to not open the East Alsek River to fishing until 2 weeks later than in recent years (June 26, statistical week 27). Most chinook salmon harvested in the East Alsek River Subdistrict were caught in the surf zone. The final chinook salmon catch of 40 fish comprised only 33% of the 1978 to 1987 average catch. The Akwe River catch of 100 chinook salmon was 35% below the 1978 to 1987 average (Appendix B.3).

The Situk River chinook salmon catch of 299 was also well below (49%) the 1978 to 1987 average catch of 592 (Appendix B.6). Early season surveys and weir counts indicated that escapement goals would not be met. Fishermen were encouraged to release chinook salmon during the first 2 weeks of the fishery. When harvests remained high, the Situk River was closed to chinook salmon retention on June 30 and remained closed until August 22 (Thomason and Woods 1988). The final Situk River weir count of 1,078 fish was 46% below the escapement goal of 2,000.

Fish aged 1.2, 1.3 and 1.4 dominated the catch and escapement in the Alsek River (Table 7). The age-0. fish in the small sample of Yakutat Bay catches indicate that non-Alaskan (i.e., British Columbia, Washington, or Oregon) fish were intercepted because age-0. chinook salmon are rare in Southeast Alaska escapements (Van Alen et al. 1986). Recent information has indicated that the Situk River supports a population of age-0. chinook salmon (K. Pahlke, ADF&G, Douglas, personal communication),

Sampling goals (600 fish) were not achieved for any of the chinook salmon fisheries or escapements because numbers of available fish were low.

Sockeye Salmon

The overall sockeye salmon harvest of 162,168 was 5% above the 1978 to 1987 average of 169,631 fish. As in recent years, the majority (70%) of the catch came from the East Alsek and Situk Rivers (61,483 and 52,108, respectively; Table 2). All other rivers had average to above average catches of sockeye salmon with the exceptions of the Italio and Alsek Rivers (Ingledue and Thomason 1989).

East Alsek River

Sockeye catches in the East Alsek River have increased dramatically since 1976 along with a concurrent increase in fishing effort. The East Alsek surf and ocean areas were open within 500 yd (457 m) of the shore at low tide and within 2 mi (3.2 km) up and down the beach from the river mouth during the same time periods as the inriver fishery (Figure 3). Peak efforts in the surf and ocean fisheries were 22 and 26 nets, respectively (Appendix B.1 in Rowse 1990). During the openings on August 7 to 13 (statistical week 33) the combined surf, ocean,

and inriver effort reached a record high level of 107 units, 81% of all active set gill net permits in the Yakutat area during that week (Appendix B.1 in Rowse 1990). The inriver area accounted for 68% of the total East Alsek River sockeye salmon harvest, the surf area accounted for 26%, and the ocean area 6%. The total East Alsek River catch of 61,483 sockeye salmon was the sixth highest catch on record but was 20% below the 1978 to 1987 average (Appendix B.1). Sockeye escapement to the East Alsek River was good, with a peak aerial survey count of 38,000 fish (Table 5). The return per spawner from the parent year escapement of 29,000 was 3.4:1, only slightly below average (Thomason and Woods 1988).

Alsek River

The Alsek River did not produce the returns of sockeye salmon that were expected based on 1983 parent-year escapement (23,000 fish through the Klukshu River weir). The catch of 6,286 sockeye salmon was 74% below the 1978 to 1987 average of 24,359 fish (Appendix B.2), and the Klukshu River weir escapement of 9,337 fish was far below the goal of 20,000 fish. This escapement was the lowest in the history of the weir and the catch was the fourth lowest catch on record. Canadian sport and subsistence fishermen harvested an additional 1,926 sockeye salmon (Table 3).

Akwe and Italio Rivers

In December 1986 the Italio River diverted its course, at a point approximately 4.5 km above its mouth, and flowed east to join the Akwe River near its mouth (Figure 4). Since then, the open fishing areas on both the Akwe and Italio Rivers have been limited to areas above the new junction. This allows separate management of each stock (Ingledue and Thomason 1989). In 1988, the Italio River was not open during the sockeye salmon season because of poor escapement levels. An aerial survey on August 4 showed a peak escapement count of 2,300 sockeye salmon, considerably below the average escapements of 9,000 fish (Thomason and Woods 1988). The Akwe River sockeye salmon catch of 12,476 was 15% above the 1978 to 1987 average catch (Appendix B.5). Fishing effort was above average on the Akwe River (i.e., up to 12 fishermen per week). This increased effort was partly caused by the closure of the Italio River. Aerial surveys were not able to provide accurate escapement counts of sockeye salmon in the Akwe River due to glacially turbid waters (Table 5). With the heavy fishing effort, the river was managed conservatively to minimize risk of overharvest (Thomason and Woods 1988).

Dangerous River

The catch of 1,350 sockeye salmon in the Dangerous River was 50% of the 1978 to 1987 average catch and reflects lower fishing effort than occurred in the past 2 years (Appendix B.5). Complete catch data were not recorded for the Dangerous River prior to 1986. Aerial surveys of the Harlequin Lake spawning areas did not show any sockeye salmon.

Situk River

The Situk River had the second highest catch of sockeye salmon since 1977. A spawner/recruit analysis of Situk River sockeye salmon was conducted by McPherson, Marshall, and Rowse (1987); they concluded that a strong density-dependent mechanism was operating in the Situk system and that maximum sustained yields would be achieved with escapements in the 40,000 to 55,000 range. This is reflected from lowered escapement goals implemented in 1987. To obtain data from this range, escapement goals were lowered from 80,000-100,000 to 50,000 fish in 1987. The 1988 Situk River weir escapement of 46,701 sockeye salmon exceeded the revised goal. The Situk River weir was also relocated this year to the lower river (2 mi upstream from the Situk-Ahrnklin Rivers fishery) (Figure 5). Escapement data was then available for direct in-season management use during the sockeye fishery. The weir was operated between June 7 and August 22. Early catches and escapement counts indicated a good return of sockeye salmon, so fishing time was extended from 1.5 d to 4 d in the second week, and to 4.5 d and 5.5 d in subsequent weeks (Thomason and Woods 1988). The catch of 52,108 fish was 84% higher than the 1978 to 1987 average catch of 28,378 (Appendix B.6).

Lost River

The Lost River fishery occurs only 2 mi west of the Situk River, and thus intercepts some fish bound for the Situk River. The Lost River is typically managed to enhance Situk River escapement by allowing fishing times coincidentally in both rivers. At the same time the smaller Lost River stock must also be managed to prevent overfishing. In 1988 fishing time on the Lost River opened at the same time as the Situk River. In subsequent weeks, weekly openings were extended on the Situk River but maintained at the normal period of 2.5 d per week on the Lost River. The final Lost River sockeye salmon catch was 2,316 fish which was 10% below the 1978 to 1987 average (Appendix B.7). The peak aerial escapement count of 1,500 sockeye salmon was below average for the Lost River (Table 5).

Yakutat Bay

The Yakutat Bay fishery showed poor catches in the first 3 weeks of the fishery. Catches improved as the season progressed, and finally produced an average (1978 to 1987) catch of 14,210 (Appendix B.8). Consequently, fishing effort was average, i.e., not as high as in 1987 when Situk River closures created increased effort in Yakutat Bay.

Manby Shore and Manby Inside Areas

The Manby fishery area produced the highest catches of sockeye salmon ever in 1988. The combined catch of 11,923 was 41% above the 1978 to 1987 average of 8,483 (Appendix B.10). This catch includes 9,153 sockeye salmon from the Manby Shore fishery and 2,119 fish from the Sudden Stream/Grand Wash inside fishery (Table 2).

Age Composition

Sampling goals were achieved in most fisheries and in the escapements to the Alsek and Situk Rivers. Escapement sampling was not conducted in any other systems due to lack of funding. Age-1.3 fish dominated the Situk River, Dangerous River, Lost River, Manby Shore, Yakutat Bay, and Alsek River fisheries (Table 10). Age-0.3 fish were the most abundant age class in the Akwe and East Alsek River fisheries. Both age classes were common in the Yakutat Bay fishery.

Temporal trends in age composition were evident in some of the Yakutat area fisheries in 1988. In the East Alsek River, age-1.3 fish declined from 9.5% in the first part of the season (statistical weeks 27 to 29) to 1.6% in the later part of the season (statistical weeks 33 to 41; Appendix B.4, B.5 *in* Rowse 1990). Historically, East Alsek River stock has been unique among large sockeye salmon stocks in that age-1.3 fish have comprised only a small fraction of the catch (1982 to 1988 average of 6.6%), while age-0.3 fish have comprised 75% (1982 to 1988 average) of the East Alsek River catch (Table 10; Appendix C.2).

The Alsek River had a consistent age composition comprised of 76 to 80% age-1.3 fish throughout the season (Appendix C.9 *in* Rowse 1990).

The percentage of age-1.3 fish in Yakutat Bay increased from 46.2% during statistical week 25 to 56.0% during statistical week 27, and then decreased steadily throughout the season. Also, age-2. fish comprised up to 25.2% of the Yakutat Bay catch during statistical weeks 25 through 30. The percentage of age-2. fish dropped to 9.3% in statistical week 31 (Appendix I.8 *in* Rowse 1990). It is known that the Situk River catch contains a high percentage of age-1.3 fish and has a strong age-2. component (Appendix C.2). This age-2. component is indicative of the Mountain Lake stock in the upper Situk River drainage (Figure 5). Also, a small proportion (range of 7.0 to 19.4%, between 1982 and 1988; Appendix C.2) of the Situk River harvest is comprised of age-0.3 fish that spawn in the Ahrnklin River (Pahlke 1989). All of these stock components common to the Situk River were present in the Yakutat Bay fishery through statistical week 30. Finally, given the early migratory timing of Situk River fish (94% of the migration through the fishery by statistical week 31) presented in Table 20, I concluded that the Yakutat Bay fishery intercepted primarily Situk River fish through statistical week 30. In statistical weeks 31 through 37, the percent of age-0.3 fish increased significantly compared to earlier weeks (Appendix I.9 *in* Rowse 1990) and the age-1.3 and age-2. components decreased. With migratory timing information indicating that the East Alsek River fishery began to build correspondingly in statistical week 32 (Table 20), I concluded that the catch of these age-0. fish in Yakutat Bay represents an interception of East Alsek River stocks. This age composition structure of the Yakutat Bay harvest was first noticed by McBride (1986). It has been supported by a coded-wire tag study of Situk River sockeye salmon that showed that Situk River fish do contribute significantly to the Yakutat Bay fishery, particularly during statistical weeks 26 through 29 (Thomason and Woods 1987).

The Alsek River catch maintained a nearly constant age composition of 76.0% to 79.8% age-1.3 fish throughout the season (Appendix C.9 *in* Rowse 1990). Age composition samples were pooled into only two periods for the Akwe River fishery

because sample sizes were small and no significant changes in age composition were assessed (Appendix D.4, D.5 in Rowse 1990).

Coho Salmon

The 1988 coho salmon set net harvest of 205,866 fish was 57% above the 1978 to 1987 average (Table 1). The 1985 harvest of 203,193 coho salmon is the only other harvest of this magnitude since 1954 (Table 1; Thomason and Woods 1988). Run-strength was strong throughout the Yakutat area, and all fishing subdistricts were allowed extended fishing time through the last 4 weeks of the season (statistical weeks 37 - 40). Peak coho producing systems were the Situk (61,689 fish) and Tsiu (56,116 fish) Rivers from which 57% of the total coho salmon harvest was taken. The East Alsek River harvest of 20,148 was a record catch: 3.58 times greater than the 1978 to 1987 average of 5,623 fish. Because no coho salmon stocks are known to spawn in the East Alsek River, this fishery intercepted primarily Doame River fish (Thomason and Woods 1988). The Manby area fishery produced a catch of 20,844 fish which more than doubled the 1978 to 1987 average of 9,196 fish.

Escapement counts in all systems were average. Final surveys in mid-October were precluded by poor weather.

Catches were dominated by age-2.1 fish. Contributions of age-1.1 fish as high as 49% (East Alsek River), while age-3.1 fish contributed between 7% and 24% in all subdistricts. Since 1981 age-1.1 and -2.1 fish have consistently dominated the age composition of coho catches, while the relative contribution of each one has varied greatly. Catch sampling goals were achieved in the Akwe and Tsiu Rivers but fell slightly short in all other systems due to lack of manpower and funding.

Chum Salmon

The East Alsek River is the only significant producer of chum salmon in the Yakutat area. The 1988 East Alsek River catch of 24,453 fish was 223% above the 1978 to 1987 average of 10,965 fish and represents 84% of the total chum harvest. Age-0.3 fish were most abundant (91%) in the 1988 catch. All other systems had average catches with the exception of the Akwe River which had a record catch of 2,288 fish. This was largely due to fish bound for the Italio River straying into the Akwe River from the common mouth area. The escapement was not sampled.

Pink Salmon

Pink salmon returns to the Yakutat area were strong in 1988 with a total harvest of 120,204 fish (Table 16). This catch was more than double the 10-year average catch of 55,015 fish from 1978 to 1987 (Table 1). The harvest of pink salmon in Humpback Creek (Yakutat Bay) accounted for 77% of the total harvest (Table 2). Escapement goals were met, so fishing time was extended throughout the pink salmon run. The catch of 15,323 pink salmon in the Situk River was 8% above the 1978 to 1987 average; the escapement of 78,753 pink salmon past the Situk River weir was average (Tables 2, 5).

LITERATURE CITED

- ADF&G (Alaska Department of Fish and Game). 1987. Southeast and Yakutat commercial finfish regulations, 1987 edition. Alaska Department of Fish and Game, Division of Commercial Fisheries, Juneau.
- Clutter, R., and L. Whitesel. 1956. Collection and interpretation of sockeye salmon scales. Bulletin International Pacific Salmon Fisheries Commission 9, Vancouver, British Columbia.
- Cochran, W. 1977. Sampling Techniques, 3rd edition. John Wiley & Sons, Inc. New York.
- Inglehue, D., and G. Thomason. 1989. Report to the Board of Fisheries, 1988 Yakutat salmon set gill net fishery. Alaska Department of Fish and Game, Division of Commercial Fisheries, Region 1 (unpublished report), Juneau.
- INPFC (International North Pacific Fisheries Commission). 1963. Annual Report - 1961. Vancouver, British Columbia.
- McBride, D. N., and A. Brogle. 1983. Catch, escapement, age, sex, and size of salmon (*Oncorhynchus* sp.) returns to the Yakutat area, 1982. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 101, Juneau.
- McBride, D. N. 1984. Compilation of catch, escapement, age, sex, and size data for salmon (*Oncorhynchus* sp.) returns to the Yakutat area, 1983. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 126, Juneau.
- McBride, D. N. 1986. Compilation of catch, escapement, age, sex, and size data for salmon (*Oncorhynchus* sp.) returns to the Yakutat area, 1984. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 164, Juneau.
- McPherson, S., S. Marshall, and M. Rowse. 1987. Situk River sockeye salmon spawner - recruit analysis. Alaska Department of Fish and Game, Division of Commercial Fisheries, Southeast Region Report 87 (2), Douglas.
- Mesiar, D. C. 1984. Abundance, age sex, and size of coho salmon (*Oncorhynchus kisutch* Walbaum) catches and escapements in Southeastern Alaska, 1982. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 104, Juneau.
- Mundy, P. R. 1979. A quantitative measure of migratory timing illustrated by application to the management of commercial salmon fisheries. Ph.D. dissertation, University of Washington, Seattle.
- Mundy, P. R. 1982. Computation of migratory timing statistics for adult chinook salmon in the Yukon River, Alaska, and their relevance to fisheries management. North American Journal of Fisheries Management 4:359-370.

LITERATURE CITED (Continued)

- Pahlke, K. P. 1989. Compilation of catch, escapement, age, and size data for salmon returns to the Yakutat area in 1987. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Fishery Report 89-22, Juneau.
- Pahlke, K. P., and R. R. Riffe. 1988. Compilation of catch, escapement, age, and size data for salmon returns to the Yakutat area in 1986. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 224, Juneau.
- Riffe, R. R., S. A. McPherson, B. W. Van Alen, and D. N. McBride. 1987. Compilation of catch, escapement, age, sex, and size data for salmon (*Oncorhynchus* sp.) returns to the Yakutat area in 1985. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 210, Juneau.
- Rowse, M. L. 1990. Data: abundance, age, sex, and size of salmon catches and escapements in the Yakutat area, 1988. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J90-13, Juneau.
- Suchanek, P. M., and A. E. Bingham. 1989. Harvest estimates for selected sport fisheries in Southeast Alaska in 1988. Alaska Department of Fish and Game, Division of Sport Fish, Fishery Data Series 114, Juneau.
- Thomason, G. J., and G. F. Woods. 1987. 1987 Annual Summary of Yakutat finfish and shellfish operations. Alaska Department of Fish and Game, Commercial Fisheries Division, Region 1 Report (unpublished), Douglas.
- Thomason, G. J., and G. F. Woods. 1988. 1988 Annual Summary of Yakutat Finfish and Shellfish Operations. Alaska Department of Fish and Game, Commercial Fisheries Division, Region 1 Report (unpublished), Douglas.
- Thompson, S. K. 1987. Sample size for estimating multinomial proportions. *The American Statistician* 41(1):42-46.
- Van Alen, B. W., and D. S. Wood. 1986. Abundance, age, sex, and size of coho salmon (*Oncorhynchus kisutch* Walbaum) catches and escapements in Southeastern Alaska, 1983. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 179, Juneau.
- Van Alen, B. W., and D. S. Wood. 1987. Abundance, age, sex, and size of coho salmon (*Oncorhynchus kisutch* Walbaum) catches and escapements in Southeastern Alaska, 1984. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 192, Juneau.

LITERATURE CITED (Continued)

- Van Aken, B. W., D. S. Wood, and S. L. Marshall. 1986. Abundance, age, sex, and size of chinook salmon (*Oncorhynchus tshawytscha* Walbaum) catches and escapements in Southeast Alaska, 1983. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 177, Juneau.
- Wood, D. S., and B. W. Van Aken. 1987. Abundance, age, sex, and size of coho salmon (*Oncorhynchus kisutch* Walbaum) catches and escapements in Southeastern Alaska, 1985. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 208, Juneau.
- Zar, J. H. 1984. Biostatistical analysis, 2nd edition. Prentice-Hall, Inc. New Jersey.

Table 1. Yakutat area annual commercial set gill net salmon catches in numbers by species, 1960 to 1988.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1960	908	44,671	119,149	12,911	277	177,916
1961	2,534	82,403	128,670	63,608	11,038	288,253
1962	2,747	73,937	170,776	26,063	616	274,139
1963	941	52,517	141,365	78,697	10,294	283,814
1964	1,488	90,175	169,780	40,038	1,481	302,962
1965	1,323	120,417	122,207	4,402	4,094	252,443
1966	1,555	185,360	66,252	1,405	3,396	257,968
1967	742	88,431	97,211	31,580	4,459	222,423
1968	697	80,776	92,005	2,130	13,866	189,474
1969	1,887	117,725	32,262	63,692	14,927	230,493
1970	2,272	112,169	29,748	3,555	7,093	154,837
1971	1,945	129,206	37,420	79,973	4,986	253,530
1972	2,376	131,484	45,704	2,903	8,290	190,757
1973	2,733	128,412	41,213	16,998	8,995	198,351
1974	2,214	82,413	77,556	4,248	4,185	170,616
1975	2,224	73,260	37,403	80,043	3,761	196,691
1976	1,830	130,176	51,743	28,492	7,746	219,987
1977	2,549	185,391	92,214	75,504	8,652	364,310
1978	3,057	130,681	137,408	30,522	6,181	307,849
1979	4,299	165,069	95,873	152,053	7,399	424,693
1980	2,800	159,152	119,648	141,998	20,151	443,749
1981	2,069	149,573	132,127	133,863	10,633	428,265
1982	1,456	212,368	148,994	9,886	6,305	379,009
1983	976	152,541	81,517	25,378	11,195	271,607
1984	1,062	102,545	182,256	19,870	32,230	337,963
1985	1,231	234,886	203,193	16,362	12,466	468,138
1986	1,425	150,619	87,871	7,248	16,609	263,772
1987	2,055	238,871	124,824	12,970	14,875	393,595
1988	893	162,168	205,866	120,204	29,247	518,378
Average:						
1960 to 1987	1,907	128,758	102,371	41,657	9,150	283,843
1978 to 1987	2,043	169,631	131,371	55,015	13,804	371,864

Table 2. Yakutat area commercial set gill net harvest in numbers of salmon by fishery, 1988.

Fishery	Chinook	Sockeye	Coho	Pink	Chum
East Alsek	40	61,483	20,148	2,628	24,453
Alsek	223	6,286	4,986	7	907
Akwe	100	12,476	13,705	1,686	2,288
Italio	0	5	1,920	6	15
Old Italio	0	0	1,131	0	0
Dangerous	0	1,305	0	0	0
Situk	299	52,108	61,689	15,323	886
Lost	22	2,316	5,905	478	41
Yakutat Bay	196	14,210	3,086	7,792	627
Humpie Cr.	0	29	78	92,173	24
Manby Shore	12	9,153	161	0	0
Manby Inside					
Manby Stream	1	632	7,087	17	1
Spoon R.	0	17	6,170	89	0
Sudden St.	0	2,119	1,005	0	0
Esker Cr.	0	2	6,421	0	2
Yana River	0	0	306	0	0
Yahtse	0	1	2,836	2	0
Kaliakh	0	2	8,867	0	0
Tsiu	0	24	56,116	3	3
Tashalich River	0	0	1,080	0	0
Kiklukh River	0	0	3,169	0	0
Total	893	162,168	205,866	120,204	29,247

Table 3. Yakutat area sport and subsistence harvest in numbers of salmon by fishery, 1988.

Fishery	Number of Permits ^a	Chinook	Sockeye	Coho	Pink	Chum
East Alsek River Subsistence	8	1	180	1		2
Alsek River						
Subsistence in Alaska	11	13	148	9		
Subsistence in Canada ^b		43	1,604			
Sport in Canada ^b		275	322	192		
Akwe River Subsistence	6	43	180	12		
Italio Subsistence	1			12		
Yakutat Bay Subsistence	13	58	248			
Situk River						
Subsistence	36	81	1,363	142	46	
Sport ^c		185	1,182	1,886	1,212	
Lost River Sport ^c				1,800	44	
Ankau Lagoon Sport ^c				2,429	9	

^a Represents number of permits that reported harvest from that area. Some permits reported catch from more than one area.

^b Data from Canadian Dept. of Fisheries and Oceans, Whitehorse, Yukon.

^c Data from Suchanek and Bingham 1989.

Table 4. Yakutat area commercial set gill net harvest in pounds and kilograms of salmon by species and fishery, 1988.

Fishery	Harvest (in lb)				
	Chinook	Sockeye	Coho	Pink	Chum
East Alsek	595	410,546	197,028	10,343	227,094
Alsek	3,428	40,990	49,170	30	7,405
Akwe	1,633	88,026	153,730	6,682	20,943
Italio		34	20,108	27	130
Old Italio			11,172		
Dangerous		8,044			
Situk	6,953	320,204	638,836	61,038	7,093
Lost	453	14,081	64,603	1,999	303
Yakutat Bay	2,642	94,343	29,791	28,124	5,188
Humpie Cr.		154	673	309,872	146
Manby Shore	185	49,035	1,585		
Manby Inside					
Manby Stream	27	3,298	66,814	72	6
Spoon R.		88	57,544	350	
Sudden St.		11,730	10,716		
Esker Cr.		8	60,655		9
Yana River			2,918		
Yahtse		6	26,310	6	
Kaliakh		16	95,631		
Tsiu		124	544,475	16	21
Tashalich River			10,262		
Kiklukh River			30,949		
Total	15,916	1,040,727	2,072,970	418,559	268,338

Fishery	Harvest (in kg)				
	Chinook	Sockeye	Coho	Pink	Chum
East Alsek	270	186,224	89,372	4,692	103,010
Alsek	1,555	18,593	22,304	14	3,359
Akwe	741	39,929	69,732	3,031	9,500
Italio		15	9,121	12	59
Old Italio			5,068		
Dangerous		3,649			
Situk	3,154	145,245	289,776	27,687	3,217
Lost	205	6,387	29,304	907	137
Yakutat Bay	1,198	42,794	13,513	12,757	2,353
Humpie Cr.		70	305	140,558	66
Manby Shore	84	22,242	719		
Manby Inside					
Manby Stream	12	1,496	30,307	33	3
Spoon R.		40	26,102	159	
Sudden St.		5,321	4,861		
Esker Cr.		4	27,513		4
Yana River			1,324		
Yahtse		3	11,934	3	
Kaliakh		7	43,378	0	
Tsiu		56	246,974	7	10
Tashalich River			4,655		
Kiklukh River			14,038		
Total	7,219	472,074	940,299	189,858	121,718

Table 5. Yakutat area escapement in numbers of salmon by river system, 1988.

Fishery ^a	Chinook	Sockeye	Coho	Pink	Chum
East Alsek River					
East Alsek River		38,000	3,000		4,000
Doame River	50	2,500			
Alsek River					
Lower Alsek Drainage	1	500	1,000		
Klukshu River Weir	2,030	9,337	2,751		
Akwe River ^b	2	50			
Italio River		2,300	3,000		50
Situk River					
Situk River Weir	1,078	46,701	1,786	78,753	231
Mainstem River ^c		5,000	11,000		
Ahrnklin/Antlen Rivers		2,630 ^d	700 ^e		
Old Situk River ^d		465 ^d	50 ^a	2,070 ^e	
Sockeye Creek ^d	1 ^e	900	50	1,000	
West Fork Situk River ^e		1	7	5,000	
Mountain Lake Weir		4,500			
Mountain Stream	4 ^d	7,500			
Lost River					
Tawah Creek		1,500	1,600 ^e	3 ^e	
Ophir Creek		800			
Coast Guard Lake			1,000 ^e		
Roadside Ditches			124 ^d		
Yakutat Bay					
Humpy Creek			^b	10,000	
Onklat Creek				1,000	
Log Dump Creek				300	
Manby Shore					
Spoon River		^b	800 ^b		
Manby Stream					
Yahtse River			700		
Kaliakh River					
Klutieth River ^b			2,500		
Tsiu River			16,000		

^a Peak aerial surveys unless noted otherwise.

^b Flooding and turbid waters prevented accurate aerial escapement counts.

^c Raft survey.

^d Foot survey.

^e Boat survey.

Table 6. Yakutat area commercial set gill net harvest in numbers of chinook salmon by fishery and statistical week. 1988.

Stat Week	Inclusive Dates	East Alsek	Alsek	Akwe	Italio	Dangerous	Situk	Lost	Yakutat Bay	Manby Shore	Manby Inside	Yahtse	Kaliakh	Tsiu	Totals
25	6/12-6/18	- ^a	98	-	-	-	-	-	11	-	-	-	-	-	109
26	6/19-6/25	-	82	-	-	-	97	b	23	-	b	-	-	-	202
27	6/26-7/02	3	34	69	-	-	202	3	52	9	b	-	-	-	372
28	7/03-7/09	5	3	13	-	-	-	b	44	b	b	-	-	-	66
29	7/10-7/16	11	2	10	-	-	-	b	36	b	b	-	-	-	59
30	7/17-7/23	9	1	2	-	-	-	b	15	-	b	-	-	-	27
31	7/24-7/30	2	3	-	-	-	-	b	6	-	-	-	-	-	11
32	7/31-8/06	4	-	2	-	-	-	b	6	-	-	-	-	-	12
33	8/07-8/13	5	b	2	-	-	-	b	1	-	b	-	-	-	8
34	8/14-8/20	-	b	2	-	-	-	b	2	-	-	-	-	-	4
35	8/21-8/27	-	-	b	-	-	-	b	-	-	b	-	-	-	0
36	8/28-9/03	-	-	-	-	-	-	-	-	-	-	-	-	-	0
37	9/04-9/10	1	-	-	-	-	-	-	-	b	-	-	-	-	1
38	9/11-9/17	-	-	-	-	-	-	-	-	-	-	-	-	-	0
39	9/18-9/24	-	-	-	-	-	-	b	-	-	-	-	-	-	0
40	9/25-10/1	-	-	-	-	-	-	b	-	-	-	-	-	-	0
41	10/2-10/8	b	-	-	-	-	-	-	-	-	-	-	-	-	0
Totals		40	223	100	0	0	299	22	196	12	1	0	0	0	893

^a Dashes (-) denote closure of the fishery for the statistical week.

^b Catches and effort data are not presented to preserve confidentiality, but data are included in subdistrict totals.

Table 7. Age composition of chinook salmon from Yakutat area commercial set gill net fisheries, 1988.

			Brood Year and Age Group						
Fishery	Total Catch	Sample Size	1985		1984		1983		1982
			0.2	1.1	0.3	1.2	0.4	1.3	1.4
Alsek River	223	110	Percent	0.9		30.9		30.0	38.2
			Std. Error	0.6		3.2		3.1	3.3
Situk River	299	30	Percent	3.3	6.7	13.3	20.0	13.3	43.3
			Std. Error	3.2	4.4	6.0	7.0	6.0	8.7
Yakutat Bay	196	13	Percent	30.8	30.8	15.4		7.7	15.4
			Std. Error	12.9	12.9	10.1		7.4	10.1

Table 8. Length composition (in mm) of chinook salmon from Yakutat area commercial set gill net fisheries, 1988.

				Brood Year and Age Group						
Fishery	Total Catch	Sample Size		1985		1984		1983		1982
				0.2	1.1	0.3	1.2	0.4	1.3	1.4
Alsek River	223	110	Ave. Length Std. Error		445		564 10.1		752 15.8	882 9.9
Situk River	299	30	Ave. Length Std. Error	560		755 20.0	628 37.0	876 17.7	860 21.5	849 26.6
Yakutat Bay	196	12	Ave. Length Std. Error	579 41.1		715 10.4	655 65.1		670	878 17.5

Table 9. Yakutat area commercial set gill net harvest of sockeye salmon in numbers by fishery and week, 1988.

Stat Week	Inclusive Dates	East Alsek	Alsek	Akwe Italio	Dangerous	Situk	Lost	Yakutat Bay	Humpy Creek	Manby Shore	Manby Inside	Yahtse	Kaliakh	Tsiu	Totals
25	6/12-6/18	- ^a	779	-	-	-	-	170	-	-	-	-	-	-	949
26	6/19-6/25	-	921	-	-	2,802	b	896	-	-	-	-	-	-	4,619
27	6/26-7/02	33	897	1,501	-	11,272	545	1,199	-	2,330	b	-	-	-	17,777
28	7/03-7/09	251	801	2,364	-	12,057	b	2,875	-	4,096	b	-	-	-	22,444
29	7/10-7/16	1,152	826	4,188	-	15,594	b	3,728	-	b	b	-	-	-	25,488
30	7/17-7/23	5,839	327	1,962	-	5,932	b	2,438	-	b	b	-	-	-	16,498
31	7/24-7/30	5,334	1,592	1,248	-	1,276	b	2,038	-	-	b	-	-	-	11,488
32	7/31-8/06	14,539	90	737	-	1,605	b	768	2	-	-	-	-	-	17,741
33	8/07-8/13	16,992	b	267	-	838	b	45	5	-	-	-	-	-	18,147
34	8/14-8/20	10,656	b	152	-	530	b	32	12	-	b	-	-	-	11,382
35	8/21-8/27	5,135	18	-	-	102	b	-	5	-	-	-	-	-	5,291
36	8/28-9/03	590	6	16	b	31	b	11	5	-	23	b	1	7	665
37	9/04-9/10	766	5	9	b	28	9	10	-	-	2	-	1	9	839
38	9/11-9/17	162	3	4	b	35	5	-	-	b	1	b	-	2	212
39	9/18-9/24	31	6	3	-	5	b	-	-	-	-	b	-	-	47
40	9/25-10/1	3	2	1	-	1	b	-	-	-	2	b	-	-	9
41	10/2-10/8	b	-	2	-	-	b	-	-	-	-	-	-	-	2
Totals		61,483	6,286	12,476	5	1,305	52,108	2,316	14,210	29	9,153	2,770	1	2	24 162,168

^a Dashes (-) denote closure of the fishery for the statistical week.

^b Catches and effort data are not presented to preserve confidentiality, but data are included in subdistrict totals.

Table 10. Age composition of sockeye salmon from Yakutat area commercial set gill net fisheries, 1988.

				Brood Year and Age Group												
Fishery	Total Catch	Sample Size		1985		1984			1983			1982			1981	
				0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4	3.3
East Alsek River	61,483	1,012	Percent Std. Error	30.5 1.6	0.1 0.1	64.1 1.7	3.1 0.6		<0.1 <0.1	2.0 0.5	0.2 0.1					
Alsek River	6,286	1,338	Percent Std. Error	0.9 0.3		2.7 0.4	14.1 1.0			77.5 1.2	1.4 0.4	0.2 0.1	3.2 0.5			
Akwe River	12,476	512	Percent Std. Error	3.7 0.8		76.6 2.1	4.3 1.0		1.1 0.5	11.8 1.6	0.8 0.4	0.6 0.4	1.0 0.5			
Dangerous River	1,305	200	Percent Std. Error	2.5 1.0		14.5 2.3	31.0 3.0			37.0 3.1	9.0 1.9		5.5 1.5	0.5 0.5		
Situk River	52,108	1,441	Percent Std. Error	1.1 0.3		14.8 1.0	14.7 1.0	<0.1 <0.1	0.3 0.2	30.2 1.4	12.5 1.0	0.6 0.2	22.1 1.2	3.4 0.5	0.1 0.1	
Lost River	2,316	74	Percent Std. Error	1.4 1.3		10.8 3.6	31.1 5.3	1.4 1.3		32.4 5.4	9.5 3.4		13.5 3.9			
Yakutat Bay	14,210	1,599	Percent Std. Error	2.7 0.4		22.1 1.1	11.6 0.9		0.2 0.1	40.8 1.3	9.1 0.8	0.2 0.1	12.2 0.9	1.1 0.3	0.1 0.1	
Manby Shore	9,153	328	Percent Std. Error	0.8 0.5	0.4 0.4	0.4 0.4	28.5 2.5			45.1 2.8	16.7 2.1	0.8 0.5	7.3 1.5			
Manby Inside	2,770	299	Percent Std. Error				37.8 2.7			37.8 2.7	21.7 2.3		2.7 0.9			

Table 11. Age composition of sockeye salmon from Yakutat area escapements, 1988.

Area	Total Escapement	Sample Size	Brood Year and Age Group												
			1985		1984			1983			1982			1981	
			0.2	1.1	0.3	1.2	2.1	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3
Mountain Lake Weir	17,172	377	Percent			2.0	0.2	3.0	49.1	0.2		33.0	11.2	0.4	1.0
			Std. Error			0.8	0.2	1.0	2.7	0.2		2.5	1.7	0.3	0.5
Situk River Weir	47,006	855	Percent	1.6	0.1	0.7	20.2	0.2	19.3	23.8	0.1	25.1	7.8	0.3	0.7
			Std. Error	0.4	0.1	0.3	1.4	0.1	1.3	1.5	0.1	1.5	0.9	0.2	0.3
Klukshu River Weir	9,337	529	Percent			1.0	10.2		75.6	2.1	0.2	2.5			
			Std. Error			0	1.3		1.8	0.6	0.2	0.7			

Table 12. Length composition (in mm) of sockeye salmon from Yakutat area commercial set gill net fisheries, 1988.

Fishery	Total Catch	Sample Size		Brood Year and Age Group												Total	
				1985		1984			1983			1982			1981		
				0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4		3.3
East Alsek River	61,483	264	Ave. Length Std. Error	508 5.6		589 1.8	504 27.7		615	587 7.6							569 2.7
Alsek River	6,286	404	Ave. Length Std. Error	472 32.4		567 12.4	501 6.4			574 1.5		575	588 7.0				562 2.1
Akwe River	12,476	225	Ave. Length Std. Error	478 13.4		581 2.4	519 8.0		641 22.5	597 5.0	488 39.0	625	540				576 2.8
Dangerous River	1,305	118	Ave. Length Std. Error	507 9.3		595 4.2	511 6.6			579 4.2	529 16.8		563 9.6	530			556 4.2
Situk River	52,108	406	Ave. Length Std. Error	500 16.2		573 3.7	511 4.7		600	571 3.0	508 4.0	620 14.5	568 2.7	541 13.1		590	552 2.1
Lost River	2,316	55	Ave. Length Std. Error	500		581 16.3	488 5.8	380		562 8.5	529 40.8		569 12.0				533 7.4
Yakutat Bay	14,210	500	Ave. Length Std. Error	524 7.4		587 2.6	518 4.4		570	580 2.1	518 4.9	630	565 3.8	520 5.9	570		565 1.8
Manby Shore	9,153	132	Ave. Length Std. Error		345	630	503 6.7			556 5.6	525 5.5	600	562 10.1				537 4.2
Manby Inside	2,770	132	Ave. Length Std. Error				480 5.7			559 3.0	498 5.9		593 2.5				516 4.3

Table 13. Yakutat area commercial set gill net harvest of coho salmon in numbers by fishery and week, 1988.

Stat Week	Inclusive Dates	East Alesek	Alesek	Akwe	Italo	Old Italo	Dangerous	Situk	Lost	Yakutat Bay	Humpy Creek	Manby Shore	Manby Inside	Yana	Yahtse	Kaliakh	Tsiu	Tashalich	Kiklukh	Totals
25	6/12-6/18	- ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
26	6/19-6/25	-	-	-	-	-	-	-	b	1	-	-	b	-	-	-	-	-	-	1
27	6/26-7/02	-	-	-	-	-	-	-	b	28	-	-	b	-	-	-	-	-	-	28
28	7/03-7/09	-	-	-	-	-	-	-	b	4	-	1	b	-	-	-	-	-	-	5
29	7/10-7/16	-	-	-	-	-	-	3	b	52	-	b	b	-	-	-	-	-	-	55
30	7/17-7/23	7	-	-	-	-	-	6	b	69	-	b	b	-	-	-	-	-	-	82
31	7/24-7/30	3	-	-	-	-	-	-	b	58	-	-	b	-	-	-	-	-	-	64
32	7/31-8/06	45	-	-	-	-	-	41	b	165	-	-	-	-	-	-	-	-	-	256
33	8/07-8/13	410	b	30	-	-	-	498	b	107	19	-	b	-	-	-	-	-	-	1,064
34	8/14-8/20	625	b	91	-	-	-	2,449	b	114	15	-	-	-	-	-	-	-	-	3,294
35	8/21-8/27	2,395	53	b	-	-	-	5,750	b	213	24	-	1,350	-	b	118	4,878	-	-	14,781
36	8/28-9/03	1,115	257	271	b	-	-	8,271	b	707	20	-	b	-	b	2,582	15,748	-	-	28,971
37	9/04-9/10	8,274	275	1,921	b	-	-	21,524	2,103	476	-	b	6,105	-	b	3,826	14,717	-	b	59,221
38	9/11-9/17	4,221	1,062	1,917	b	-	-	11,104	1,275	b	-	-	6,414	-	b	1,041	12,095	-	b	39,129
39	9/18-9/24	2,260	1,722	5,664	-	-	-	9,425	1,739	b	-	-	3,132	-	b	1,163	6,523	b	b	31,628
40	9/25-10/1	626	1,061	2,771	-	b	-	1,531	b	b	-	-	1,771	-	b	b	2,155	-	b	9,915
41	10/2-10/8	b	555	1,008	-	-	-	1,087	b	-	-	-	-	-	-	-	-	-	-	2,650
Totals		20,148	4,986	13,705	1,920	1,131	0	61,689	5,905	3,086	78	161	20,683	306	2,836	8,867	56,116	1,080	3,169	205,866

^a Dashes (-) denote closure of the fishery for the statistical week.

^b Catches and effort data are not presented to preserve confidentiality, but data are included in subdistrict totals.

Table 14. Age composition of coho salmon from Yakutat area commercial set gill net fisheries, 1988.

Fishery	Total Catch	Sample Size		Brood Year and Age Group			
				1985	1984	1983	1982
				1.1	2.1	3.1	4.1
East Alsek River	20,148	372	Percent Std. Error	49.3 2.8	42.3 2.8	7.4 1.4	1.0 0.6
Alsek River	4,986	353	Percent Std. Error	22.9 2.2	66.9 2.4	10.2 1.6	
Akwe River	13,705	217	Percent Std. Error	28.1 3.0	58.1 3.3	13.4 2.3	0.5 0.5
Italio River	1,920	213	Percent Std. Error	33.8 3.1	54.9 3.2	10.8 2.0	0.5 0.4
Situk River	61,689	384	Percent Std. Error	34.6 2.8	52.8 3.0	11.7 2.0	0.8 0.6
Lost River	5,905	145	Percent Std. Error	39.3 4.0	49.7 4.1	11.0 2.6	
Yakutat Bay	3,086	364	Percent Std. Error	17.6 1.9	64.8 2.4	17.3 1.9	0.3 0.3
Manby Inside	20,683	182	Percent Std. Error	8.2 2.0	66.5 3.5	24.2 3.2	1.1 0.8
Yahtse River	2,836	291	Percent Std. Error	11.0 1.7	63.6 2.7	24.4 2.4	1.0 0.6
Kaliakh River	8,867	97	Percent Std. Error	34.0 4.8	47.4 5.1	16.5 3.8	2.1 1.4
Tsiu River	56,116	361	Percent Std. Error	20.8 2.1	66.5 2.5	12.8 1.7	

Table 15. Length composition (in mm) of coho salmon from Yakutat area commercial set gill net fisheries, 1988.

Fishery	Total Catch	Sample Size		Brood Year and Age Group				Total
				1985	1984	1983	1982	
				1.1	2.1	3.1	4.1	
East Alsek River	20,148	123	Ave. Length Std. Error	623 7.4	638 7.0	665 9.5		634 4.7
Alsek River	4,986	121	Ave. Length Std. Error	626 6.8	647 4.9	656 11.7		642 3.9
Akwe River	13,705	116	Ave. Length Std. Error	637 8.0	667 3.9	695 7.0		664 3.6
Italio River	1,920	57	Ave. Length Std. Error	640 8.0	680 5.7	674 16.1	695	665 5.0
Situk River	61,689	162	Ave. Length Std. Error	624 6.9	653 4.2	651 8.6	645	644 3.7
Lost River	5,905	60	Ave. Length Std. Error	659 5.7	671 4.8	677 7.3		668 3.4
Yakutat Bay	3,086	177	Ave. Length Std. Error	635 8.5	661 3.6	677 5.9	675	660 3.2
Manby Inside	20,683	94	Ave. Length Std. Error	646 12.3	646 4.0	646 8.3	710	646 3.6
Yahtse River	2,836	85	Ave. Length Std. Error	593 22.8	649 5.1	650 12.0		644 5.2
Kaliakh River	8,867	37	Ave. Length Std. Error	668 10.3	686 10.2	674 14.4		677 6.6
Tsiu River	56,116	150	Ave. Length Std. Error	624 7.9	639 3.9	653 8.0		638 3.3

Table 16. Yakutat area commercial set gill net harvest of pink salmon in numbers by fishery and week, 1988.

Stat Week	Inclusive Dates	East Alsek	Alsek	Akwe	Italio	Dangerous	Situk	Lost	Yakutat Bay	Humpy Creek	Manby Shore	Manby Inside	Yahtse	Kaliakh	Tsiu	Totals
25	6/12-6/18	- ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	0
26	6/19-6/25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
27	6/26-7/02	-	-	-	-	-	1	-	9	-	-	b	-	-	-	10
28	7/03-7/09	1	-	7	-	-	27	-	11	-	-	b	-	-	-	46
29	7/10-7/16	13	2	25	-	-	339	-	79	-	-	b	-	-	-	458
30	7/17-7/23	88	-	18	-	-	686	-	69	-	-	b	-	-	-	861
31	7/24-7/30	71	2	85	-	-	289	-	601	-	-	b	-	-	-	1,048
32	7/31-8/06	249	5	430	-	-	2,357	-	1,654	278	-	-	-	-	-	4,970
33	8/07-8/13	1,044	b	455	-	-	3,837	-	4,123	8,472	-	-	-	-	-	17,931
34	8/14-8/20	636	-	542	-	-	5,031	-	863	42,410	-	-	-	-	-	49,482
35	8/21-8/27	347	-	b	-	-	1,820	-	121	27,225	-	16	b	-	3	29,532
36	8/28-9/03	34	1	28	b	-	431	-	203	13,788	-	36	b	-	-	14,485
37	9/04-9/10	137	-	48	b	-	438	-	59	-	-	1	b	-	-	721
38	9/11-9/17	7	-	26	b	-	52	-	-	-	-	-	b	-	-	86
39	9/18-9/24	1	-	2	b	-	12	-	-	-	-	-	b	-	-	15
40	9/25-10/1	-	-	-	-	-	2	-	-	-	-	-	-	-	-	2
41	10/2-10/8	b	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Totals		2,628	7	1,686	6	0	15,323	478	7,792	92,173	0	106	2	0	3	120,204

^a Dashes (-) denote closure of the fishery for the statistical week.

^b Catches and effort data are not presented to preserve confidentiality, but data are included in subdistrict totals.

Table 17. Yakutat area commercial set gill net harvest of chum salmon in numbers by fishery and week, 1988.

Stat Week	Inclusive Dates	East Alsek	Alsek	Akwe	Italio	Dangerous	Situk	Lost	Yakutat Bay ^c	Manby Shore	Manby Inside	Yahtse	Kaliakh	Tsiu	Totals
25	6/12-6/18	- ^a		-	-	-	-	b	5	-	-	-	-	-	5
26	6/19-6/25	-		-	-	-	3	b	8					-	11
27	6/26-7/02			4	-	-	8	b	72		b			-	90
28	7/03-7/09	3		23	-	-	8	b	7		b			-	41
29	7/10-7/16	2		173	-	-	59	b	73		b			-	307
30	7/17-7/23	44	1	159	-	-	165	b	106		b			-	475
31	7/24-7/30	119	2	524	-	-	16	b	150		b			-	811
32	7/31-8/06	744	5	678	-	-	90	b	125					-	1,642
33	8/07-8/13	2,388	b	343	-	-	65	b	28					-	2,824
34	8/14-8/20	2,694	b	325	-	-	186	b	24		b			-	3,229
35	8/21-8/27	4,229	7	b			43	b	10					-	4,289
36	8/28-9/03	1,883	14	22	b		61	b	21		b			-	2,001
37	9/04-9/10	9,700	37	14	b		131	b	22		3			2	9,910
38	9/11-9/17	2,082	217	5	b		39	b						1	2,344
39	9/18-9/24	456	271	4			7	b							739
40	9/25-10/1	102	280	4			4	b							390
41	10/2-10/8	b	64				1	b							65
Totals		24,453	907	2,288	15	0	886	41	651	0	3	0	0	3	29,247

^a Dashes (-) denote closure of the fishery for the statistical week.

^b Catches and effort data are not presented to preserve confidentiality, but data are included in subdistrict totals.

^c Includes 24 chum salmon caught in Humpy Creek.

Table 18. Age composition of chum salmon from Yakutat area commercial set gill net fisheries, 1988.

Fishery	Total Catch	Sample Size		Brood Year and Age Group	
				1985	1984
				0.3	0.4
East Alsek River	24,453	391	Percent	90.5	9.5
			Std. Error	1.5	1.5

Table 19. Length composition (in mm) of chum salmon from Yakutat area commercial set gill net fisheries, 1988.

Fishery	Total Catch	Sample Size		Brood Year and Age Group		Total
				1985	1984	
				0.3	0.4	
East Alsek River	24,453	93	Ave. Length	631	655	636
			Std. Error	3.5	8.6	3.4

Table 20. Migratory timing statistics of the sockeye salmon migration through the commercial set gill net fisheries in the Yakutat area, 1988, including mean statistical week (MSW), standard deviation (SD), and coefficient of variation (CV) by major fishery.

Stat Week	East Alsek River	Alsek River	Akwe River	Situk River	Yakutat Bay	Mean	SD	CV
25.0	0.000	0.124	0.000	0.000	0.012	0.027	0.054	199.9
26.0	0.000	0.270	0.000	0.054	0.075	0.080	0.112	139.7
27.0	0.001	0.413	0.120	0.270	0.159	0.193	0.156	81.2
28.0	0.005	0.541	0.310	0.501	0.362	0.344	0.212	61.7
29.0	0.023	0.672	0.645	0.801	0.624	0.553	0.304	55.0
30.0	0.118	0.724	0.803	0.915	0.796	0.671	0.316	47.2
31.0	0.205	0.977	0.903	0.939	0.939	0.793	0.330	41.6
32.0	0.441	0.992	0.962	0.970	0.993	0.871	0.241	27.7
33.0	0.717	0.993	0.983	0.986	0.996	0.935	0.122	13.0
34.0	0.890	0.994	0.995	0.996	0.999	0.975	0.047	4.9
35.0	0.973	0.997	0.997	0.998	0.999	0.993	0.011	1.1
36.0	0.983	0.997	0.998	0.999	0.999	0.995	0.007	0.7
37.0	0.996	0.998	0.999	0.999	1.000	0.998	0.002	0.2
38.0	0.998	0.999	1.000	1.000	1.000	0.999	0.001	0.1
39.0	0.999	1.000	1.000	1.000	1.000	1.000	0.001	0.1
40.0	0.999	1.000	1.000	1.000	1.000	1.000	0.001	0.1
41.0	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.0
Grand Statistics								
MSW	32.7	28.3	29.3	28.6	29.0	Mean	SD	CV
SD	1.64	2.27	1.61	1.61	1.65	29.57	1.8	6.0
CV	5.0	8.0	5.5	5.6	5.7			
Class	Late	Avg.	Avg.	Avg.	Avg.			

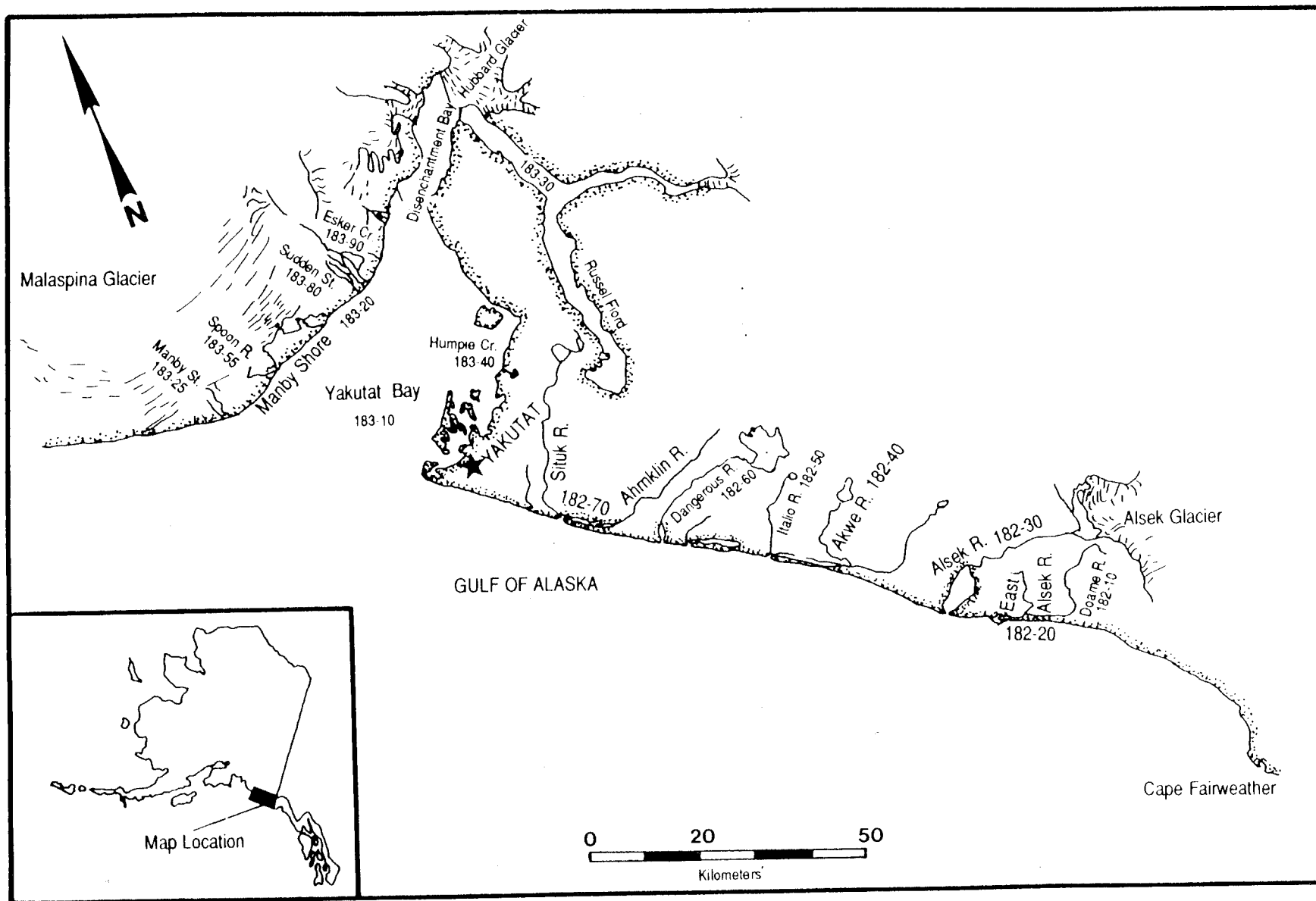


Figure 1. Yakutat Area, Alaska, from Cape Fairweather to Malaspina Glacier showing fishing district boundaries.

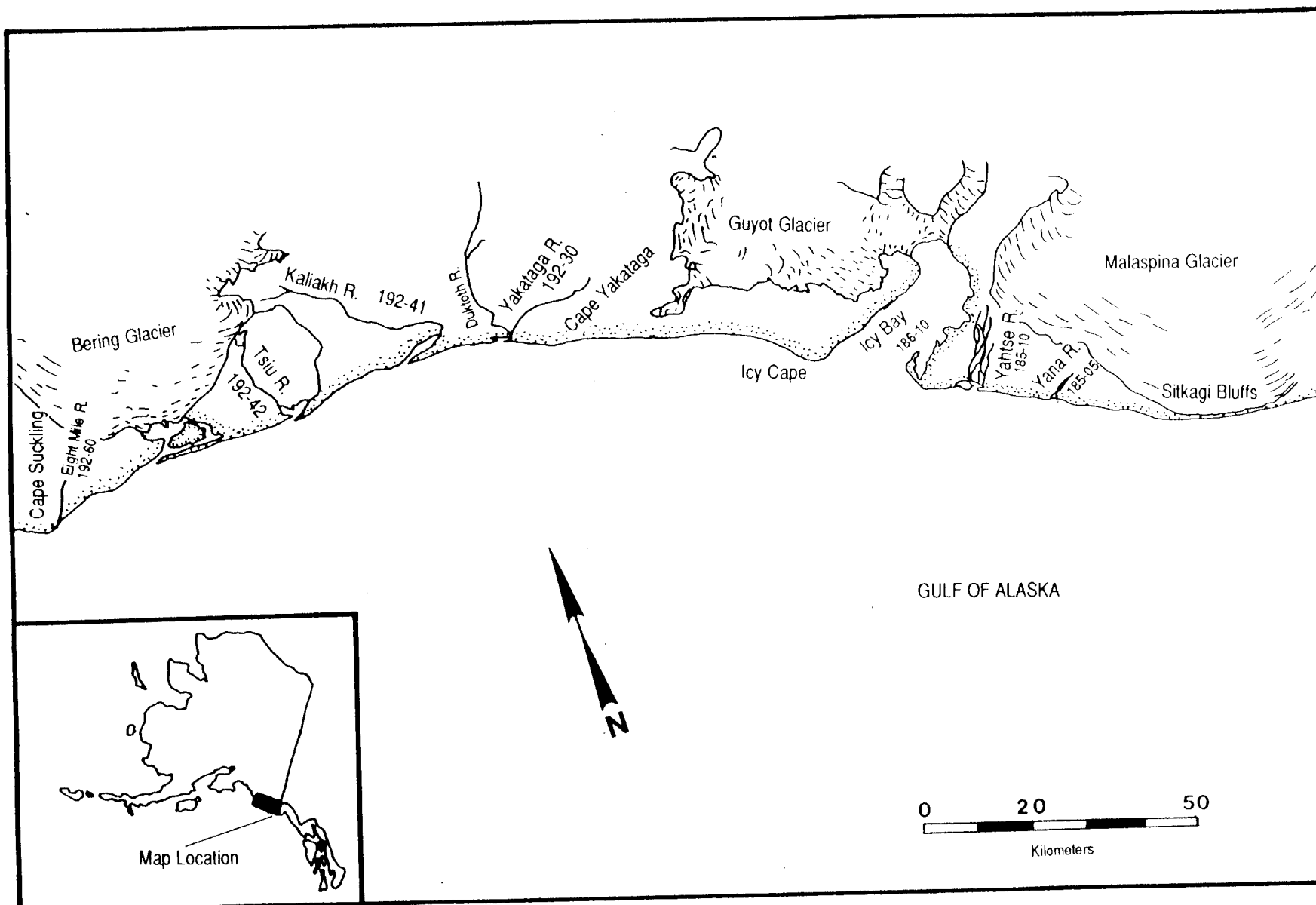


Figure 2. Yakutat Area, Alaska, from Malaspina Glacier to Cape Suckling showing fishing district boundaries.

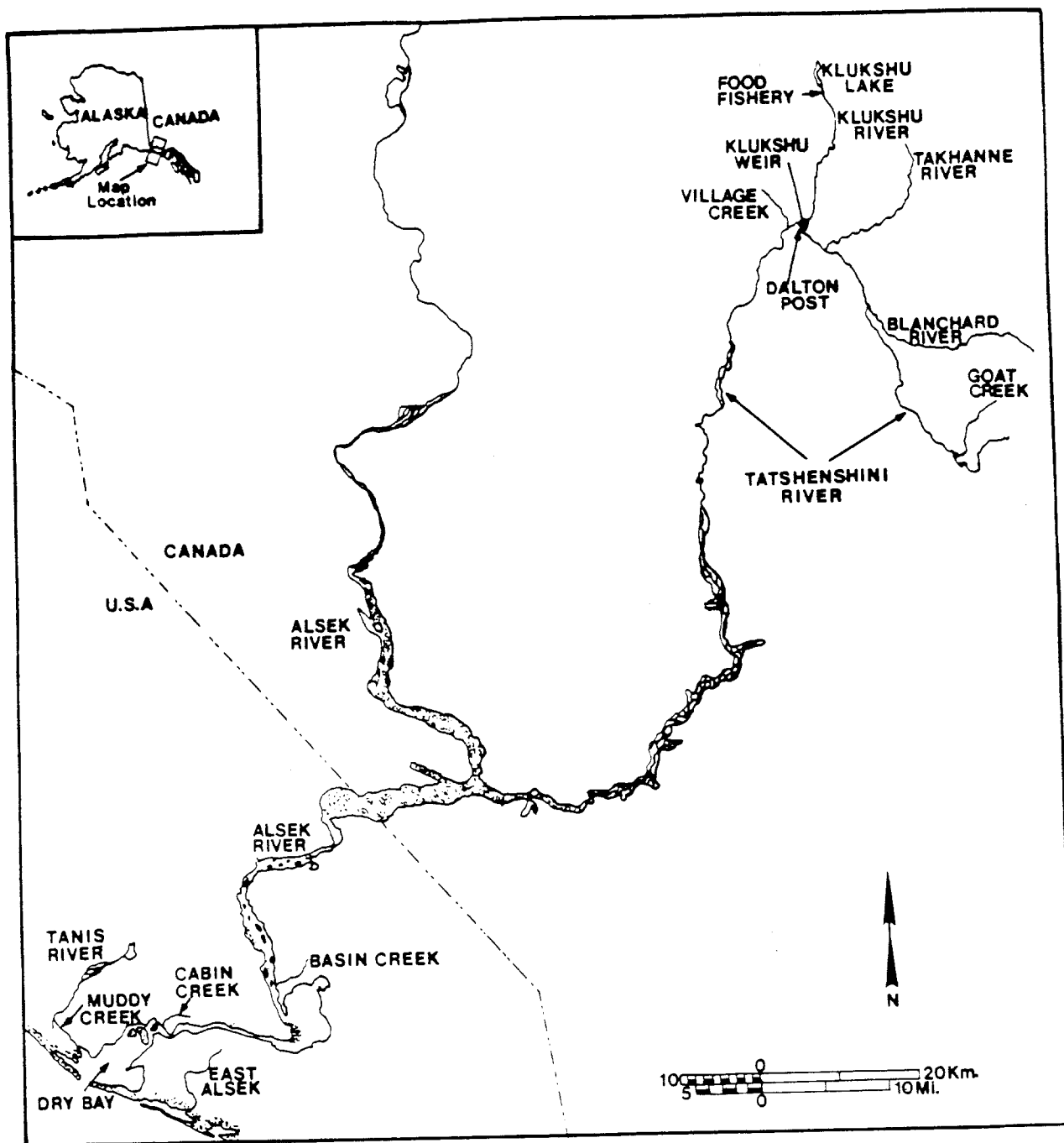


Figure 3. Alsek River system.

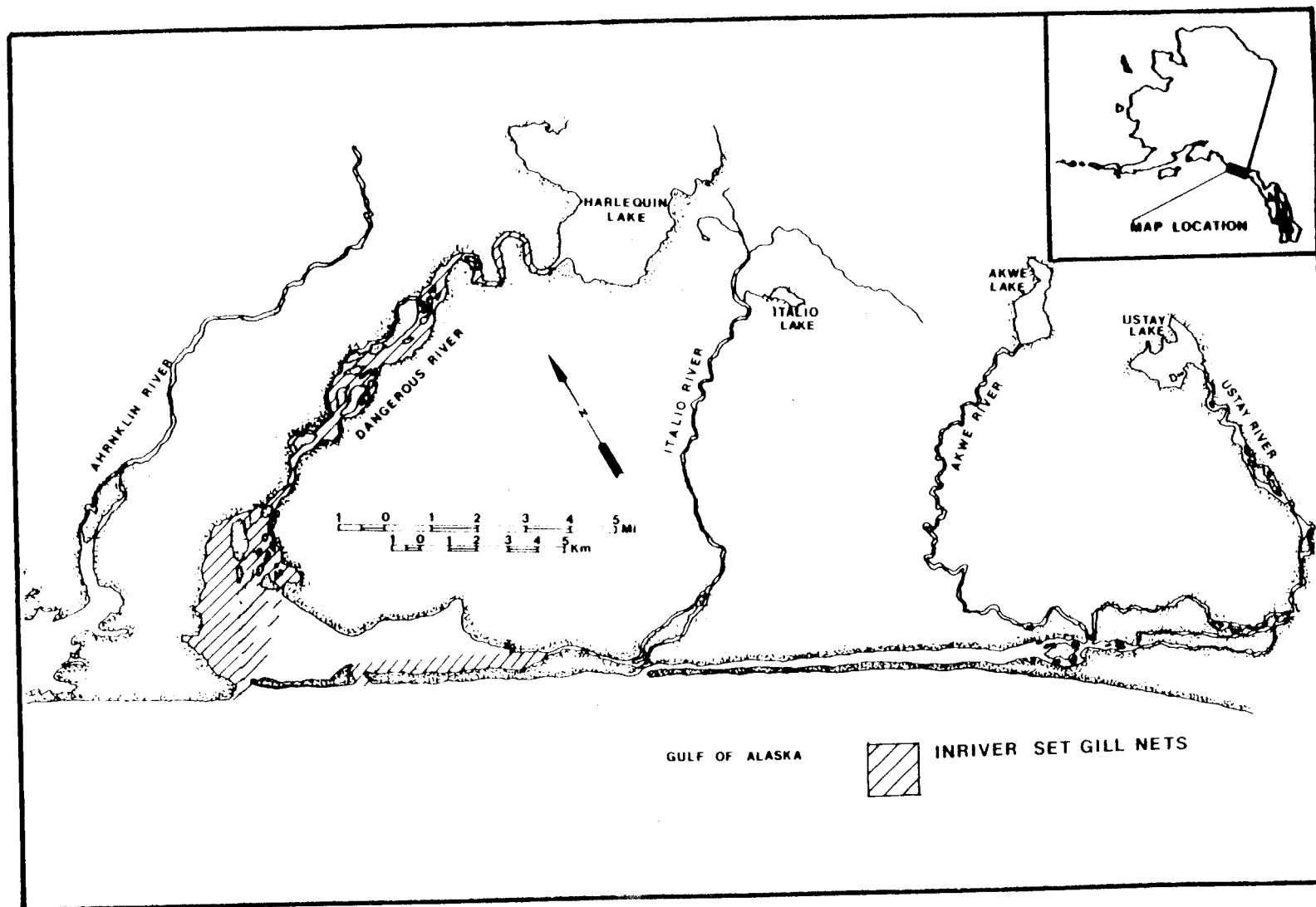


Figure 4. Italo and Akwe River systems.

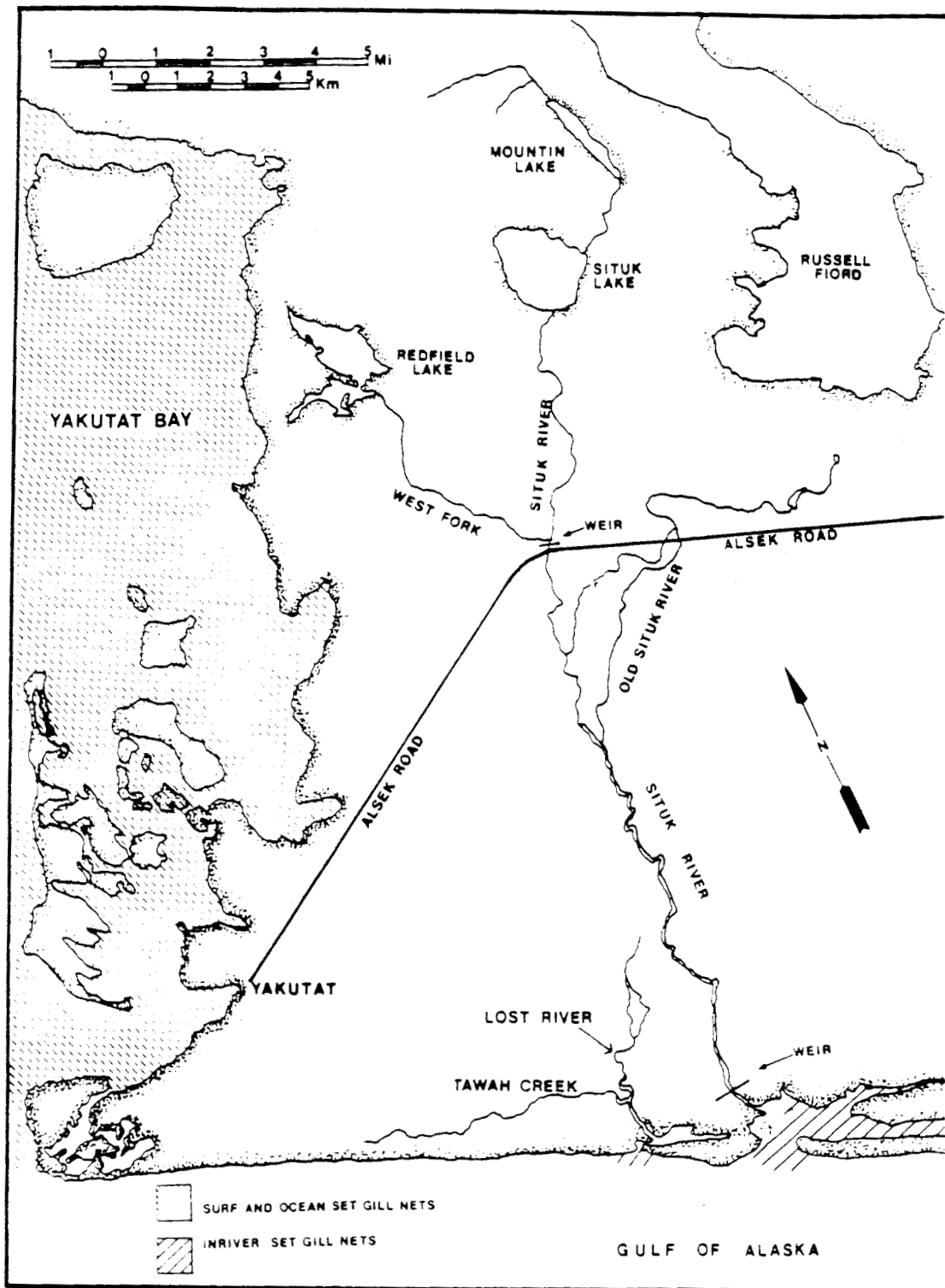


Figure 5. Situk River system showing commercial set gill net fishing areas.

Appendix A.1 Numbered statistical weeks used to report commercial catches, 1988.

Stat Week Number	From	To	Stat Week Number	From	To
1	Jan 1	Jan 2	28	Jul 3	Jul 9
2	Jan 3	Jan 9	29	Jul 10	Jul 16
3	Jan 10	Jan 16	30	Jul 17	Jul 23
4	Jan 17	Jan 23	31	Jul 24	Jul 30
5	Jan 24	Jan 30	32	Jul 31	Aug 6
6	Jan 31	Feb 6	33	Aug 7	Aug 13
7	Feb 7	Feb 13	34	Aug 14	Aug 20
8	Feb 14	Feb 20	35	Aug 21	Aug 27
9	Feb 21	Feb 27	36	Aug 28	Sep 3
10	Feb 28	Mar 5	37	Sep 4	Sep 10
11	Mar 6	Mar 12	38	Sep 11	Sep 17
12	Mar 13	Mar 19	39	Sep 18	Sep 24
13	Mar 20	Mar 26	40	Sep 25	Oct 1
14	Mar 27	Apr 2	41	Oct 2	Oct 8
15	Apr 3	Apr 9	42	Oct 9	Oct 15
16	Apr 10	Apr 16	43	Oct 16	Oct 22
17	Apr 17	Apr 23	44	Oct 23	Oct 29
18	Apr 24	Apr 30	45	Oct 30	Nov 5
19	May 1	May 7	46	Nov 6	Nov 12
20	May 8	May 14	47	Nov 13	Nov 19
21	May 15	May 21	48	Nov 20	Nov 26
22	May 22	May 28	49	Nov 27	Dec 3
23	May 29	Jun 4	50	Dec 4	Dec 10
24	Jun 5	Jun 11	51	Dec 11	Dec 17
25	Jun 12	Jun 18	52	Dec 18	Dec 24
26	Jun 19	Jun 25	53	Dec 25	Dec 31
27	Jun 26	Jul 2			

Appendix A.2. Sample size needed to describe the age composition of a two-, three-, four-, five-, six-, or seven-age class population of increasing size with a precision of $\pm 5\%$ and a probability of 0.10.

Population Size	Sample Size Needed With The Following Number of Groups ^a					
	2	3	4	5	6	7
500	176	223	215	205	195	185
1,000	213	287	274	258	242	227
1,500	229	318	301	282	263	246
2,000	238	336	317	296	275	256
2,500	244	347	328	305	283	263
3,000	248	355	335	311	288	268
3,500	251	361	340	316	292	271
4,000	253	366	345	319	296	274
4,500	255	370	348	322	298	276
5,000	256	373	351	325	300	278
6,000	258	378	355	328	303	280
7,000	260	381	358	331	305	282
8,000	261	384	360	333	307	284
9,000	262	386	362	334	308	285
10,000	263	387	363	335	309	286
15,000	265	392	368	339	312	288
20,000	266	395	370	341	314	290
25,000	267	397	371	342	315	291
30,000	268	398	372	343	316	291
35,000	268	398	373	344	316	292
40,000	268	399	373	344	316	292
45,000	268	399	374	344	317	292
50,000	269	400	374	345	317	292
60,000	269	400	375	345	317	293
70,000	269	401	375	345	318	293
80,000	269	401	375	346	318	293
90,000	269	401	375	346	318	293
100,000	269	401	376	346	318	293
infinite	270	403	377	347	319	294

^a Sample sizes for an infinitely large population are based on Thompson (1987); sample sizes for finite populations are based on the following formula (Cochran 1977):

$$n' = \frac{n_o}{1 + \frac{(n_o - 1)}{N}}$$

Where: n' = adjusted sample size
 n_o = sample size needed for an infinitely large population
 N = population size

Appendix B.1. Annual commercial set gill net salmon catches in the East Alsek River in numbers and by species.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1960	525	16,502	5,932	53	109	23,121
1961	0	1,784	310	195	10,564	12,853
1962	2,278	14,475	8,362	93	133	25,341
1963	0	3,233	264	162	9,894	13,553
1964	0	853	5,122	1,081	665	7,721
1965	0	824	1,039	176	3,727	5,766
1966	1	2,863	1,061	45	2,908	6,878
1967	0	2,473	318	1	4,282	7,074
1968	1	3,798	3,482	484	12,967	20,732
1969	4	10,886	1,134	178	14,495	26,697
1970	9	21,673	3,325	296	7,010	32,313
1971	59	12,416	3,722	309	4,483	20,989
1972	10	9,575	1,685	0	7,774	19,044
1973	33	12,342	1,353	109	6,152	19,989
1974	129	14,520	3,231	109	3,231	21,220
1975	147	18,235	1,442	114	3,150	23,088
1976	156	29,726	1,280	136	6,416	37,714
1977	115	21,420	4,140	505	6,811	32,991
1978	61	30,922	7,635	200	5,363	44,181
1979	287	47,442	4,124	1,052	5,791	58,696
1980	76	48,366	2,456	557	18,255	69,710
1981	125	49,346	6,933	2,397	8,650	67,451
1982	84	98,837	2,578	493	4,731	106,723
1983	36	81,201	4,988	359	9,392	95,976
1984	121	39,353	10,924	839	22,354	73,591
1985	119	184,962	8,932	1,018	10,705	205,736
1986	111	74,972	2,823	348	14,317	92,571
1987	170	113,267	4,841	82	10,087	128,447
1988	40	61,483	20,148	2,628	24,453	108,752
Average:						
1960 to 1987	166	34,510	3,694	407	7,658	46,435
1978 to 1987	119	76,867	5,623	735	10,965	94,308

Appendix B.2. Annual commercial set gill net salmon catches in the Alsek River in numbers and by species.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1960	0	0	0	0	0	0
1961	2,120	23,339	7,679	84	86	33,308
1962	0	0	0	0	0	0
1963	131	6,055	7,164	42	34	13,426
1964	591	14,127	9,760	144	367	24,989
1965	719	28,487	9,638	10	72	38,926
1966	934	29,091	2,688	22	240	32,975
1967	225	11,108	10,090	107	30	21,560
1968	215	26,918	10,586	82	240	38,041
1969	685	29,259	2,493	38	61	32,536
1970	1,128	22,654	2,188	6	26	26,002
1971	1,222	25,314	4,730	3	120	31,389
1972	1,827	18,717	7,296	37	280	28,157
1973	1,757	26,523	4,395	26	283	32,984
1974	1,162	16,747	7,046	13	107	25,075
1975	1,379	13,842	2,230	16	261	17,728
1976	512	19,741	4,883	0	368	25,504
1977	1,402	40,780	11,817	689	483	55,171
1978	2,441	50,580	13,913	59	233	67,226
1979	2,525	41,449	6,158	142	263	50,537
1980	1,382	25,589	7,863	21	1,005	35,860
1981	779	23,697	10,096	65	816	35,453
1982	532	27,389	6,534	6	358	34,819
1983	94	18,546	5,253	20	432	24,345
1984	60	14,326	7,868	24	1,610	23,888
1985	213	5,940	5,622	3	427	12,205
1986	478	24,791	1,344	13	462	27,088
1987	347	11,281	2,517	0	1,924	16,069
1988	223	6,286	4,986	7	907	12,409
Average:						
1960 to 1987	888	21,296	6,138	60	378	28,759
1978 to 1987	885	24,359	6,717	35	753	32,749

Appendix B.3. Annual commercial set gill net salmon catches in the Akwe River in numbers and by species.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1960	1	2,071	5,125	372	31	7,600
1961	0	5,206	13,359	1,844	78	20,487
1962	0	4,445	10,009	1,751	117	16,322
1963	27	4,276	6,913	10,152	51	21,419
1964	12	4,314	6,775	1,056	232	12,389
1965	15	3,611	2,703	83	156	6,568
1966	154	7,173	912	81	73	8,393
1967	65	4,496	2,014	244	72	6,891
1968	94	3,276	5,375	209	254	9,208
1969	45	4,384	601	372	239	5,641
1970	39	3,314	1,536	50	18	4,957
1971	62	9,310	4,656	24	0	14,052
1972	102	3,223	5,267	22	128	8,742
1973	88	6,132	4,670	164	125	11,179
1974	46	1,620	4,988	73	96	6,823
1975	65	3,177	3,160	773	83	7,258
1976	46	4,169	3,816	155	311	8,497
1977	108	4,936	10,299	630	272	16,245
1978	36	2,524	14,903	202	123	17,788
1979	116	7,055	10,223	2,372	139	19,905
1980	110	28,687	8,624	129	186	37,736
1981	108	15,467	6,691	918	64	23,248
1982	129	4,971	10,945	129	82	16,256
1983	99	5,822	5,290	152	74	11,437
1984	152	17,729	8,714	1,049	625	28,269
1985	144	4,676	4,429	94	27	9,370
1986	384	9,087	8,618	43	101	18,233
1987	257	12,125	7,119	33	551	20,085
1988	100	12,476	13,705	1,686	2,288	30,255
Average:						
1960 to 1987	89	6,688	6,348	828	154	14,107
1978 to 1987	154	10,814	8,556	512	197	20,233

Appendix B.4. Annual commercial set gill net salmon catches in the Italo River in numbers and by species.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1960	0	839	4,336	18	34	5,227
1961	0	3,693	1,704	696	166	6,259
1962	1	1,375	7	12	6	1,401
1963	0	0	1,266	44	0	1,310
1964	0	0	0	0	0	0
1965	0	0	0	0	0	0
1966	0	0	0	0	0	0
1967	0	0	0	0	0	0
1968	0	593	3,866	161	106	4,726
1969	0	0	1,637	7	30	1,674
1970	0	88	150	5	0	243
1971	0	0	0	0	0	0
1972	0	0	940	9	0	949
1973	1	1,723	1,785	215	1,382	5,106
1974	2	99	5,460	49	487	6,097
1975	1	365	3,064	70	239	3,739
1976	2	1,239	4,553	344	410	6,548
1977	7	1,166	4,912	1,048	773	7,906
1978	4	1,012	8,130	218	385	9,749
1979	19	2,315	6,110	3,622	910	12,976
1980	3	302	6,927	366	524	8,122
1981	3	1,668	6,138	2,657	709	11,175
1982	6	2,931	6,940	287	610	10,774
1983	0	1,349	4,804	445	605	7,203
1984	1	7,543	9,213	1,490	5,592	23,839
1985	4	1,314	9,491	359	435	11,603
1986	21	4,010	1,856	0	903	6,790
1987	2	902	1,399	3	677	2,983
1988	0	5	3,051	6	15	3,077
Average:						
1960 to 1987	3	1,233	3,382	433	535	5,586
1978 to 1987	6	2,335	6,101	945	1,135	10,521

Appendix B.5. Annual commercial set gill net salmon catches in the Dangerous River in numbers and by species.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1960	0	0	0	0	0	0
1961	0	0	0	0	0	0
1962	0	0	0	0	0	0
1963	0	0	0	0	0	0
1964	0	0	0	0	0	0
1965	0	0	0	0	0	0
1966	0	0	0	0	0	0
1967	0	0	0	0	0	0
1968	0	264	0	0	0	264
1969	0	0	0	0	0	0
1970	0	0	0	0	0	0
1971	0	0	0	0	0	0
1972	0	0	0	0	0	0
1973	0	0	132	0	1	133
1974	0	0	0	0	0	0
1975	0	0	0	0	0	0
1976	0	0	0	0	0	0
1977	0	16	553	8	2	579
1978	0	29	1,144	15	5	1,193
1979	0	0	0	0	0	0
1980	0	0	0	0	0	0
1981	0	0	1,861	0	20	1,881
1982	0	0	0	0	0	0
1983	0	0	0	0	0	0
1984	3	142	267	0	0	412
1985	7	557	17	16	0	597
1986	10	2,811	202	22	8	3,053
1987	4	2,433	0	0	0	2,437
1988	0	1,305	0	0	0	1,305
Average:						
1960 to 1987	1	223	149	2	1	377
1978 to 1987	2	597	349	5	3	957

Appendix B.6. Annual commercial set gill net salmon catches in the Situk River in numbers by species.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1960	312	18,888	25,613	3,701	78	48,592
1961	367	35,411	26,324	12,589	97	74,788
1962	337	43,426	53,502	12,273	325	109,863
1963	466	29,541	38,294	14,266	276	82,843
1964	706	55,729	43,079	13,431	135	113,080
1965	442	66,874	20,454	3,229	122	91,121
1966	411	126,452	15,963	952	145	143,923
1967	203	61,255	23,278	19,832	67	104,635
1968	312	29,249	19,149	518	273	49,501
1969	1,089	55,856	10,656	2,897	85	70,583
1970	927	46,249	11,879	1,142	16	60,213
1971	473	62,364	21,389	2,890	79	87,195
1972	303	80,405	17,848	966	87	99,609
1973	752	67,194	10,026	11,395	171	89,538
1974	791	42,228	32,968	3,263	16	79,266
1975	562	30,354	16,408	6,686	2	54,012
1976	1,002	60,678	15,664	6,939	171	84,454
1977	833	83,970	32,020	24,347	202	141,372
1978	382	31,363	32,057	7,294	53	71,149
1979	1,028	46,384	17,624	30,131	236	95,403
1980	969	32,357	21,935	32,823	76	88,160
1981	858	29,093	37,871	26,515	252	94,589
1982	248	29,751	27,549	4,482	140	62,170
1983	349	17,797	15,186	6,864	240	40,436
1984	512	7,401	47,511	12,446	844	68,714
1985	484	18,620	55,223	8,800	166	83,293
1986	202	7,617	14,760	1,503	120	24,202
1987	891	63,399	29,861	10,933	986	106,070
1988	299	52,108	61,689	15,323	886	130,305
Average: 1960 to 1987	550	44,400	26,526	9,948	212	81,636
1978 to 1987	592	28,378	29,958	14,179	311	73,419

Appendix B.7. Annual commercial set gill net salmon catches in the Lost River in numbers and by species.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1960	46	3,800	9,546	1,187	2	14,581
1961	18	5,319	8,447	924	4	14,712
1962	32	4,744	10,783	679	20	16,258
1963	62	3,346	10,228	1,149	19	14,804
1964	64	6,868	12,197	2,166	20	21,315
1965	58	10,012	7,463	349	8	17,890
1966	12	9,374	2,605	103	5	12,099
1967	8	3,909	3,275	970	2	8,164
1968	44	6,145	6,958	59	12	13,218
1969	34	6,777	3,133	333	0	10,277
1970	50	6,550	2,401	160	8	9,169
1971	22	6,012	2,719	70	2	8,825
1972	19	4,076	3,627	35	6	7,763
1973	23	4,495	2,385	458	26	7,387
1974	18	1,948	4,300	280	4	6,550
1975	29	1,976	3,486	427	9	5,927
1976	42	4,607	3,786	783	15	9,233
1977	25	8,925	6,052	3,138	17	18,157
1978	21	3,831	6,360	789	7	11,008
1979	59	3,818	4,265	1,923	35	10,100
1980	42	3,880	6,813	2,035	12	12,782
1981	11	2,316	7,471	634	16	10,448
1982	12	4,980	9,366	719	14	15,091
1983	3	2,158	5,223	1,554	9	8,947
1984	22	726	10,717	1,864	96	13,425
1985	12	1,418	9,098	315	14	10,857
1986	6	491	2,489	80	9	3,075
1987	39	2,159	3,810	125	38	6,171
1988	22	2,316	5,905	478	41	8,762
Average:						
1960 to 1987	30	4,452	6,036	832	15	11,365
1978 to 1987	23	2,578	6,561	1,004	25	10,190

Appendix B.8. Annual commercial set gill net salmon catches in Yakutat Bay in numbers and by species.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1960	24	2,521	1,801	7,302	12	11,660
1961	28	7,485	2,976	47,254	43	57,786
1962	99	5,472	6,068	11,255	15	22,909
1963	141	3,541	3,198	5,457	8	12,345
1964	115	7,716	6,796	22,160	62	36,849
1965	86	10,177	2,490	525	8	13,286
1966	43	9,903	1,861	202	25	12,034
1967	241	4,848	1,332	9,605	6	16,032
1968	31	10,526	1,281	169	14	12,021
1969	29	10,410	1,133	1,504	13	13,089
1970	119	11,596	99	660	15	12,489
1971	106	13,732	50	597	3	14,488
1972	115	15,488	258	492	15	16,368
1973	79	9,962	377	2,886	23	13,327
1974	64	5,187	1,326	455	12	7,044
1975	41	5,144	447	3,094	5	8,731
1976	69	9,977	1,179	1,639	55	12,919
1977	53	14,150	91	8,202	81	22,577
1978	108	5,399	635	6,618	9	12,769
1979	51	3,635	556	3,396	5	7,643
1980	164	9,341	2,063	16,150	79	27,797
1981	151	14,389	1,806	12,024	68	28,438
1982	419	24,852	3,991	3,688	269	33,219
1983	371	17,844	3,739	6,793	428	29,175
1984	145	9,213	3,381	2,139	1,010	15,888
1985	240	11,665	3,618	5,514	685	21,722
1986	211	21,724	3,060	5,234	680	30,909
1987	329	24,984	2,411	1,794	605	30,123
1988	196	14,210	3,086	7,792	627	25,911
Average: 1960 to 1987	131	10,746	2,072	6,672	152	19,773
1978 to 1987	219	14,305	2,526	6,335	384	23,768

Appendix B.9. Annual commercial set gill net salmon catches in Humpy Creek in numbers and by species.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1960	0	0	0	0	0	0
1961	0	0	0	0	0	0
1962	0	0	0	0	0	0
1963	0	29	327	47,324	11	47,691
1964	0	0	0	0	0	0
1965	0	0	0	0	0	0
1966	0	0	0	0	0	0
1967	0	0	1	821	0	822
1968	0	0	0	445	0	445
1969	1	153	913	58,351	4	59,422
1970	0	44	0	1,235	0	1,279
1971	1	58	154	76,080	299	76,592
1972	0	0	700	1,322	0	2,022
1973	0	36	8	1,738	6	1,788
1974	0	0	0	0	0	0
1975	0	167	296	68,863	12	69,338
1976	1	39	326	18,486	0	18,852
1977	0	240	59	36,922	11	37,232
1978	0	1	27	14,997	1	15,026
1979	210	6,723	599	109,412	17	116,961
1980	0	10	333	89,852	6	90,201
1981	0	134	373	88,389	28	88,924
1982	0	0	0	0	0	0
1983	0	5	130	9,047	3	9,185
1984	0	19	138	18	43	218
1985	0	55	0	210	0	265
1986	1	101	1	0	1	104
1987	0	0	0	0	0	0
1988	0	29	78	92,173	24	92,304
Average:						
1960 to 1987	8	279	157	22,268	16	22,727
1978 to 1987	21	705	160	31,193	10	32,088

Appendix B.10. Annual commercial set gill net salmon catches in the Manby Shore and Manby Inside areas in numbers and by species.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1960	0	0	0	0	0	0
1961	0	0	0	0	0	0
1962	0	0	0	0	0	0
1963	114	2,496	21,827	101	1	24,539
1964	0	35	26,638	0	0	26,673
1965	3	430	11,167	19	1	11,620
1966	0	0	0	0	0	0
1967	0	0	7,783	0	0	7,783
1968	0	7	7,638	3	0	7,648
1969	0	0	4,833	12	0	4,845
1970	0	1	3,190	1	0	3,192
1971	0	0	0	0	0	0
1972	0	0	2,953	0	0	2,953
1973	0	5	1,770	6	824	2,605
1974	2	64	2,199	6	232	2,503
1975	0	0	3,426	0	0	3,426
1976	0	0	11,906	10	0	11,916
1977	6	9,785	12,130	10	0	21,931
1978	2	3,149	9,277	126	1	12,555
1979	2	6,232	4,575	3	0	10,812
1980	54	10,620	8,611	65	2	19,352
1981	34	13,463	8,161	164	10	21,832
1982	26	18,657	10,544	35	101	29,363
1983	24	7,819	5,391	142	12	13,388
1984	45	6,093	17,594	1	8	23,741
1985	8	5,677	16,119	33	7	21,844
1986	0	5,013	4,080	3	5	9,101
1987	15	8,109	7,606	0	4	15,734
1988	13	11,923	20,844	106	3	32,889
Average:						
1960 to 1987	12	3,488	7,479	26	43	11,048
1978 to 1987	21	8,483	9,196	57	15	17,772

Appendix B.11. Annual commercial set gill net salmon catches in the Yahtse River in numbers and by species.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1960	0	50	5.005	2	0	5.057
1961	1	166	16.454	9	0	16.630
1962	0	0	19.863	0	0	19.863
1963	0	0	16.280	0	0	16.280
1964	0	0	0	0	0	0
1965	0	0	0	0	0	0
1966	0	0	0	0	0	0
1967	0	0	4.735	0	0	4.735
1968	0	0	11.807	0	0	11.807
1969	0	0	1.800	0	0	1.800
1970	0	0	4.980	0	0	4.980
1971	0	0	0	0	0	0
1972	0	0	5.130	20	0	5.150
1973	0	0	4.908	0	0	4.908
1974	0	0	6.679	0	0	6.679
1975	0	0	3.444	0	0	3.444
1976	0	0	0	0	0	0
1977	0	3	2.672	5	0	2.680
1978	2	104	3.428	4	1	3.539
1979	0	0	3.752	0	0	3.752
1980	0	0	15.016	0	3	15.019
1981	0	0	11.524	100	0	11.624
1982	0	0	7.668	1	0	7.669
1983	0	0	6.796	2	0	6.798
1984	1	0	1.526	0	0	1.527
1985	0	0	3.707	0	0	3.707
1986	0	0	18.278	2	2	18.282
1987	0	204	12.688	0	1	12.893
1988	0	1	2.836	2	0	2.839
Average:						
1960 to 1987	0	19	6.719	5	0	6.744
1978 to 1987	0	31	8.438	11	1	8.481

Appendix B.12. Annual commercial set gill net salmon catches in the Kaliakh River in numbers and by species.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1960	0	0	51,622	271	10	51,903
1961	0	0	51,417	13	0	51,430
1962	0	0	23,443	0	0	23,443
1963	0	0	15,833	0	0	15,833
1964	0	0	24,769	0	0	24,769
1965	0	1	25,896	3	0	25,900
1966	0	0	12,202	0	0	12,202
1967	0	0	9,486	0	0	9,486
1968	0	0	5,799	0	0	5,799
1969	0	0	785	0	0	785
1970	0	0	0	0	0	0
1971	0	0	0	0	0	0
1972	0	0	0	0	0	0
1973	0	0	601	0	2	603
1974	0	0	1,101	0	0	1,101
1975	0	0	0	0	0	0
1976	0	0	1,221	0	0	1,221
1977	0	0	1,778	0	0	1,778
1978	0	0	5,507	0	0	5,507
1979	0	0	5,266	0	0	5,266
1980	0	0	8,725	0	0	8,725
1981	0	0	3,093	0	0	3,093
1982	0	0	16,443	46	0	16,489
1983	0	0	4,598	0	0	4,598
1984	0	0	13,081	0	0	13,081
1985	0	2	23,015	0	0	23,017
1986	1	2	10,770	0	1	10,774
1987	1	8	15,923	0	2	15,934
1988	0	2	8,867	0	0	8,869
Average:						
1960 to 1987	0	0	11,871	12	1	11,883
1978 to 1987	0	1	10,642	5	0	10,648

Appendix B.13. Annual commercial set gill net salmon catches in the Tsiu River in numbers and by species.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1960	0	0	10,169	5	1	10,175
1961	0	0	0	0	0	0
1962	0	0	38,739	0	0	38,739
1963	0	0	19,771	0	0	19,771
1964	0	533	34,644	0	0	35,177
1965	0	1	41,357	8	0	41,366
1966	0	504	28,960	0	0	29,464
1967	0	342	34,899	0	0	35,241
1968	0	0	16,064	0	0	16,064
1969	0	0	3,144	0	0	3,144
1970	0	0	0	0	0	0
1971	0	0	0	0	0	0
1972	0	0	0	0	0	0
1973	0	0	8,803	1	0	8,804
1974	0	0	8,258	0	0	8,258
1975	0	0	0	0	0	0
1976	0	0	3,129	0	0	3,129
1977	0	0	5,691	0	0	5,691
1978	0	1,767	34,392	0	0	36,159
1979	2	16	32,621	0	3	32,642
1980	0	0	28,711	0	3	28,714
1981	0	0	30,109	0	0	30,109
1982	0	0	46,436	0	0	46,436
1983	0	0	20,119	0	0	20,119
1984	0	0	51,322	0	48	51,370
1985	0	0	63,922	0	0	63,922
1986	0	0	19,590	0	0	19,590
1987	0	0	35,747	0	0	35,747
1988	0	24	56,116	3	3	56,146
Average:						
1960 to 1987	0	113	22,021	1	2	22,137
1978 to 1987	0	178	36,297	0	5	36,481

Appendix C.1. Age composition of chinook salmon in the Yakutat area commercial set gill net harvests, 1982 to 1988.

District	Year	Total Catch	Sample Size	Percent By Age Class											
				0.2	1.1	0.3	1.2	0.4	1.3	2.2	0.5	1.4	2.3	1.5	2.4
East Alsek River	1982	84	25				4.10		28.02			67.88			
	1983														
	1984														
	1985														
	1986	111	4						75.00			25.00			
	1987														
	1988														
Alsek River	1982	532	77			1.32	19.55		35.15			42.67		1.32	
	1983	94	41				12.20		46.34			39.02	2.44		
	1984	60	21		4.80		23.80		47.60			23.80			
	1985	213	54				25.90		53.70			20.40			
	1986	478	163		0.60	1.20	35.00	0.60	56.40			6.10			
	1987	345	114	0.80	0.80		8.20	0.80	61.50			28.00			
	1988	223	110		0.90		30.90		30.00			38.20			
Akwe River	1982	129	50		2.33		45.74		40.31			11.63			
	1983	99	63				19.05		74.60			6.35			
	1984	144	48				6.30		72.90			20.80			
	1985														
	1986	384	93		2.20		54.80		32.30			10.80			
	1987	190	48			6.30	10.40		81.30			2.10			
	1988														
Situk River	1982	248	17				17.74		29.44			52.82			
	1983	349	222		1.35	1.35	34.68	0.90	51.35	0.90		9.46			0.45
	1984	512	53			1.90	7.50		84.90			5.70			
	1985	484	101	1.00			24.80		45.50			28.70			
	1986	202	69			1.40	24.60	1.40	50.70			21.70			
	1987	759	68	1.60		1.60	1.60	1.60	66.10			29.20			
	1988	299	30	3.30		6.70	13.30	20.00	13.30			43.30			
Yakutat Bay	1982	419	42	4.95		4.95	26.13		40.09			23.87			
	1983	371	61	21.31	1.64	13.11	37.70		19.67			6.56			
	1984	145	14	7.10		14.30	14.30		42.90			14.30	7.10		
	1985	240	16			6.30	12.50		37.50			43.80			
	1986	211	67	4.50		6.00	16.40	7.50	53.70			11.90			
	1987	319	52	34.70		5.40	13.90	4.40	17.90		4.40	19.30			
	1988	196	13	30.80		30.80	15.40		7.70			15.40			

Appendix C.2. Age composition of sockeye salmon in the Yakutat area commercial set gill net harvests, 1982 to 1988.

District	Year	Total Catch	Sample Size	Percent By Age Class														
				0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	1.5	2.4	3.3
East Alsek River	1982	98,355	624		17.79		67.15	5.93		0.48	8.17	0.32		0.16				
	1983	81,201	1,450		5.04		87.68	1.82		0.09	5.28	0.05		0.04				
	1984	37,862	1,355		23.80		62.60	1.70			12.40	0.10						
	1985	147,137	1,268		10.00		88.00	0.40		<0.10	1.00	0.40		<0.10				
	1986	74,972	1,147		12.10		72.20	6.20			8.60	0.50		0.40	<0.10			
	1987	133,723	1,369	1.40	8.40	0.20	80.40	0.70		0.10	8.60	0.20	<0.10	0.10				
	1988	61,483	1,012		30.50	0.10	64.10	3.10		<0.10	2.00	0.20						
Alsek River	1982	27,177	1,556		0.76		3.77	15.68		0.08	70.75	2.01	0.17	6.77				
	1983	18,564	2,011		1.27		5.35	5.91			86.88	0.09	0.12	0.37				
	1984	14,251	1,892		0.50		7.50	3.70			86.20	0.10	0.40	1.70				
	1985	5,940	1,521		1.50		7.10	24.60		0.10	60.20	2.70	1.10	2.80				
	1986	24,791	1,647		1.60		7.20	15.10			67.40	1.70	0.20	6.80				
	1987	11,299	1,653		0.40		11.50	2.80			81.80	<0.10	0.50	3.10				
	1988	6,286	1,338		0.90		2.70	14.10			77.50	1.40	0.20	3.20				
Akwe River	1982	5,331	527		14.24		44.79	12.51		0.56	25.62	0.38		1.71	0.19			
	1983	5,822	602		15.33		61.53	4.20		0.06	18.12	0.09	0.15	0.51				
	1984	17,601	601		0.10		62.60	0.10		0.10	37.10							
	1985	4,676	423		7.80	0.40	53.70	4.70		6.50	24.40	0.70	0.70	1.20				
	1986	9,087	725		22.30		49.20	2.50			21.20	1.30	0.30	3.20				
	1987	12,133	603		0.60		92.30	0.50		0.40	5.60	0.20		0.30				
	1988	12,476	512		3.70		76.60	4.30		1.10	11.80	0.80	0.60	1.00				
Italio River	1982	2,931	386		3.38		22.28	16.34			51.25	2.32	0.27	4.16				
	1983	1,349	535		3.39		42.82	2.90			49.66	0.28		0.93				
	1984	8,294	533		0.20		57.60	0.20			41.40	0.10		0.50				
	1985	1,314	253		7.70		35.00	11.60		12.60	29.10	2.80	0.50	0.50				
	1986	4,010	693		4.80		35.40	6.40		0.30	49.60	1.00	0.30	2.10				
	1987	778	329		1.10		84.50	0.80			12.20	0.50		0.90				
	1988																	
Dangerous River	1986	2,811	469		1.00		4.80	33.10			42.30	8.60		10.20				
	1987																	
	1988	1,305	200		2.50		14.50	31.00			37.00	9.00		5.50	0.50			
Situk River	1982	29,742	1,304		1.23		6.99	7.55		0.07	44.29	7.37	0.16	31.57	0.31			0.45
	1983	17,797	1,479		0.58	0.25	6.50	6.51		0.10	73.41	2.75	0.42	9.35			0.13	
	1984	7,400	769		0.10	0.20	19.40	12.70	0.30		53.40	3.10	0.10	10.70				
	1985	18,620	1,842	<0.10	2.50	0.10	10.90	16.40	<0.10	1.30	49.80	6.00	0.60	12.20		0.10	0.10	
	1986	7,617	975		1.30		13.90	11.40		<0.10	44.90	6.10	<0.10	22.20				0.20
	a 1987	61,980	1,585		0.20	0.10	11.60	1.90			55.80	3.70	0.20	26.10			<0.10	0.10
	1988	52,108	1,441		1.10		14.80	14.70	<0.10	0.30	30.20	12.50	0.60	22.10	3.40			0.10

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Appendix C.2. (page 2 of 2).

District	Year	Total Catch	Sample Size	Percent By Age Class														
				0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	1.5	2.4	3.3
Lost River	1982	5,035	311		0.32		7.41	14.48			45.64	10.61		21.23	0.32			
	1983	2,158	679		1.94		13.48	12.24			63.50	3.44	0.06	5.34				
	1984	726	83				14.40	6.00			70.00	1.20		8.40				
	1985	1,418	373		2.50		5.50	25.60		1.00	57.00	2.80	1.00	4.50				
	1986	491	157		3.40		18.30	21.30			43.30	4.60		9.10				
	1987	1,976	504		2.80		20.90	1.70			63.50	1.30		9.50			0.20	
	1988	2,316	74		1.40		10.80	31.10	1.40		32.40	9.50		13.50				
Yakutat Bay	1982	658	25,749		3.50		37.84	6.99		0.15	39.66	1.37		10.18	0.15			0.15
	1983	17,844	1,574		1.34	0.03	29.07	6.60		0.03	57.92	1.30	0.15	3.58				
	1984	9,191	815				37.50	4.40		0.30	50.40	1.20	0.30	5.80				
	1985	11,665	1,247		1.30		11.00	14.60		0.90	60.20	5.70	0.70	5.60				
	1986	21,724	1,761		2.60		32.70	9.00		0.10	41.40	3.10	0.10	10.80				0.10
	1987	24,943	1,621		0.80		44.10	2.00		0.10	51.00	0.20	0.20	1.70				
	1988	14,210	1,599		2.70		22.10	11.60		0.20	40.80	9.10	0.20	12.20	1.10		0.10	
Manby Shore	1982	17,328	463		0.86		6.26	13.39			61.14	4.75		12.53	0.21			0.86
	1983	7,819	851		0.23		8.59	24.46			57.66	3.14	0.35	5.56				
	1984	6,014	462	0.10	0.10	0.10	7.00	9.10			74.60	1.50		7.30				
	1985	5,677	676		0.60	0.30	0.60	20.80			54.10	17.40	0.20	5.70	0.20		0.10	
	1986	5,013	349		0.30		5.20	37.00			29.80	8.60		18.30				0.90
	1987	8,057	545				11.50	2.80			83.10	1.10		1.50				
	1988	6,153	328		0.80	0.40	0.40	28.50			45.10	16.70	0.80	7.30				
Manby Inside	1988	2,770	299					37.80			37.80	21.70		2.70				

Appendix C.3. Age composition of sockeye salmon in the Yakutat area escapements, 1982 to 1988.

District	Year	Total Escapement	Sample Size	Percent By Age Class													
				0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4	3.3
East Alsek River	1982	80,000	539	0.19	32.28	0.19	51.21	9.09			7.05						
	1983	65,000	433	0.23	8.31		88.45	0.46			2.54						
	1984	29,000	429	0.90	8.40		86.70	0.20			3.50			0.20			
	1985	60,000	424	1.40	32.30		61.80	3.30			0.90	0.20					
	1986	37,000	519	0.40	32.40		58.30	1.90			6.20			0.40			
	1987	34,000	415	1.20	5.80	0.20	89.20	0.50			3.10						
	1988	38,000	0														
Alsek River	1982	33,699	394				1.01	3.04			94.16			1.78			
	1983	20,492	348		0.29			9.77			89.94						
	1984	12,727	100			1.00	1.00	1.00			94.00		3.00				
	1985	18,620	207				10.20	3.90			84.50		0.50	1.00			
	1986	24,880															
	1987	10,504	407					19.90			78.40	0.50		1.20			
	1988	9,337	0														
Akwe River	1982	8,000	107	0.90	20.70		51.40	7.50			14.00	1.80		3.70			
	1983	9,000	309	0.32	28.80		58.58	1.62			8.09	0.97		1.62			
	1984	7,000	400	0.30	8.50		75.70	1.50			14.00						
	1985	7,000	207	1.90	45.90		32.90	9.20	0.50	1.40	5.80	1.90		0.50			
	1986	2,613	411		35.00		56.70	1.70			5.60			1.00			
Italio River	1982	9,000	388	0.26		1.03	0.26	29.38			60.59	3.34		4.89			0.26
	1983	8,000	323		1.24	0.62	0.62	15.79			80.19	0.93		0.62			
	1984	8,000	310		0.10	0.10	3.20	28.60	0.40		48.80	5.40		13.00			0.30
	1985	8,000	393		12.70	0.50	1.50	55.20			27.00	3.10					
Situk River	1982	80,511	1,089				0.78	11.37	0.10		40.95	14.32		30.61	1.71		0.16
	1983	63,645	1,468	0.10	1.78	0.43	0.69	20.21	0.10		66.15	4.09	0.07	6.39			
	1984	58,088	1,286		0.10	0.10	3.20	28.60	0.40		48.80	5.40		13.00			0.30
	1985	107,586	999		0.10		0.20	28.20			34.90	16.30		19.10	0.30	0.60	0.20
	1986	71,543	1,017				1.40	14.80			61.10	7.00	0.20	15.40			
	1987	72,720	942				1.00	4.20			73.30	5.20	0.80	14.90	0.20		0.10
	1988	47,006	855		1.60	0.10	0.70	20.20	0.20		19.30	23.80	0.10	25.10	7.80	0.30	0.70
Lost River	1982	6,000	220		24.08	3.63	7.27	40.02	0.92		17.72	4.55		1.82			
	1983	10,000	260	1.54	10.00		46.15	19.62			22.31						
	1984	2,100	321	0.30	2.80	4.00	7.20	16.50	0.30		60.20	2.20		6.50			
	1985																
	1986	1,500	97		12.40	1.00	17.50	33.00			24.70	5.20		6.20			
	1988	1,500	0														

Appendix C.4. Age composition of coho salmon in the Yakutat area commercial set gill net harvests, 1982 to 1988.

District	Year	Total Catch	Sample Size	Percent By Age Class						
				1.1	2.0	1.2	2.1	3.0	3.1	4.1
East Alsek River	1982	2,578	64	45.35			51.51		3.14	
	1983	4,988	600	55.67			44.17		0.17	
	1984	10,926	498	89.60			10.40			
	1985	8,474	453	57.80			39.30		2.60	0.20
	1986	2,823	320	50.10			42.40		7.20	0.30
	1987	5,134	417	26.60			59.10		13.00	1.40
	1988	20,148	372	49.30			42.30		7.40	1.00
Alsek River	1982	6,534	289	55.67			44.71		0.17	
	1983	5,253	536	42.35			56.72		0.93	
	1984	7,868	450	56.70			43.30			
	1985	5,622	431	22.50			70.20		7.00	0.30
	1986	1,344	218	22.90			67.40		9.20	0.50
	1987	2,537	111	15.90			53.20		30.10	0.80
	1988	4,986	353	22.90			66.90		10.20	
Akwe River	1982	10,585	339	47.48			49.86		2.65	
	1983	5,290	571	45.71			53.24		1.05	
	1984	8,714	338	35.20			64.80			
	1985	8,618	472	31.20			57.30		11.10	0.30
	1986									
	1987	7,945	475	16.00			61.70		21.10	1.20
	1988	13,705	217	28.10			58.10		13.40	0.50
Italio River	1982	6,940	327	49.55			48.30		2.15	
	1983	4,808	219	68.64			30.91		0.45	
	1984	9,213	544	55.10			44.50			
	1985	9,491	523	37.20			51.80		9.50	1.50
	1986	1,856	436	37.70			56.40		5.50	0.40
	1987	1,331	508	66.60			32.40		1.00	
	1988	1,920	213	33.80			54.90		10.80	0.50
Situk River	1982	27,549	474	50.63			46.42		2.95	
	1983	15,186	597	62.31			37.35		0.34	
	1984	47,524	502	68.70		0.20	31.10			
	1985	55,223	528	52.30			42.80		4.90	<0.1
	1986	14,760	446	41.40			55.70		2.90	
	1987	30,269	440	32.40			58.70		7.80	0.80
	1988	61,689	384	34.60			52.80		11.70	0.80
Lost River	1982	9,366	311	63.81			35.94		0.26	
	1983	5,223	532	54.70			44.55		0.75	
	1984	10,717	547	72.50		0.20	27.10		0.20	
	1985	9,098	492	47.80			49.50		2.60	<0.1
	1986	2,489	511	30.70			54.90		13.40	0.90
	1987	3,646	472	34.10			52.70		11.90	1.30
	1988	5,905	145	39.30			49.70		11.00	
Yakutat Bay	1982	4,483	27	48.14			48.16		3.70	
	1983	3,739	485	41.24			57.73		1.03	
	1984	3,519	70	37.10			62.90			
	1985	3,455	184	34.50			55.20		9.50	0.80
	1986	3,060	509	27.30			63.70		8.80	0.10
	1987	2,520	423	18.20			44.80		32.20	4.20
	1988	3,086	364	17.60			64.80		17.30	0.30

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Appendix C.4. (page 2 of 2).

District	Year	Total Catch	Sample Size	Percent By Age Class						
				1.1	2.0	1.2	2.1	3.0	3.1	4.1
Manby Shore (inside)	1982	10,044	288	27.43			69.10		3.47	
	1983	5,391	328	34.45			63.72		1.83	
	1984	17,601	326	27.30			70.60		2.10	
	1985	16,119	584	11.80			79.10		9.00	0.10
	1986	4,080	504	18.60	0.40		71.10		9.50	0.30
	1987	7,549	424	9.00			51.60		35.50	3.60
	1988	20,683	182	8.20			66.50		24.20	1.10
Yahtse River	1982	7,668	385	44.42			53.50		2.09	
	1983	6,565	207	35.75			61.35		2.90	
	1984	1,526	95	20.00	5.30		48.40	2.10	24.20	
	1985									
	1986	18,278	490	13.60	<0.10		69.70		16.20	0.40
	1987	12,873	502	9.10			66.10		22.30	2.50
	1988	2,836	291	11.00			63.60		24.40	1.00
Kaliakh River	1982	16,443	138	44.21			55.07		0.72	
	1983	4,598	578	41.70			57.04		1.21	
	1984	13,081	296	66.40			33.20		0.40	
	1985	23,015	225	31.30			59.70		9.10	
	1986	10,770	581	22.10			65.60		11.90	0.40
	1987	15,709	429	26.60			56.70		16.20	0.50
	1988	8,867	97	34.00			47.40		16.50	2
Tsiu River	1982	46,436	320	42.81			53.44		3.75	
	1983	20,119	527	50.66			47.63		1.71	
	1984	51,322	415	73.10			26.70		0.20	
	1985	63,922	425	39.80			55.10		5.10	
	1986	19,590	530	42.50			47.60		9.00	0.80
	1987	35,685	307	26.10			58.50		14.30	1.00
	1988	56,116	361	20.80			66.50		12.80	

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